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7-8 EDWARD VII.

SESSIONAL PAPER No. 25b

A. 1908

DEPARTMENT OF THE INTERIOR

ANNUAL REPORT

OF THE

TOPOGRAPHICAL SURVEYS

BRANCH

1906-1907

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1908

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REPORT

OF THE

SURVEYOR GENERAL OF DOMINION LANDS

1906-1907

DEPARTMENT OF THE INTERIOR,
TOPOGRAPHICAL SURVEYS BRANCH,
OTTAWA, September 16, 1907.

The Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit the following report on the operations of the Topographical Surveys Branch for last year.

Heretofore the annual report has been for the fiscal year which ended June 30. Owing to the fact that June 30 came in the middle of the surveying season and the consequent difficulty of estimating the surveys made to that date, it has been the practice to make the statement and estimates of surveys in the field for the calendar year. Now that the end of the fiscal year has been changed to March 31, the fiscal year and the surveying season correspond fairly well, and it will be possible in future to have all statements for the fiscal year. In order, however, to bring this report to date, it is being made to cover the surveys for fifteen months, from January 1, 1906, to March 31, 1907.

SURVEYS FOR THE FIFTEEN MONTHS ENDING MARCH 31, 1907.

During this period, one hundred and forty-nine whole townships and eleven fractional townships were completely subdivided, while one hundred and forty-two townships were partially subdivided. Also, twenty-nine whole townships and one fractional township were completely re-surveyed while one hundred and twenty-three townships were partially re-surveyed. Sixty-four survey parties were employed, fifty-five being engaged on township surveys and nine on other surveys. Of the parties organized, thirty-five were paid by the day and twenty-nine were working under contract. Four of the parties under daily pay were located in Manitoba, eight in Saskatchewan, eight in Alberta, five in British Columbia, one in the Northwest Territories, and nine were part of the time in one province and part in another. Six contractors were located in Manitoba, seven in Saskatchewan, thirteen in Alberta, one in British Columbia and two part of the time in one province and part in another.

The contract surveys were inspected by Messrs. Geo. McMillan, P. R. A. Belanger, G. J. Lonergan, L. E. Fontaine, G. A. Grover and E. W. Hubbell, but with the exception of Mr. McMillan, their time was not entirely occupied with this work. The number of contracts examined was twenty-four.

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TOWNSHIP SURVEYS.

The reports of the surveyors in charge of parties are given as appendices 13 to 45 inclusive; a perusal of these reports shows many instances of hard work and devotion to duty.

An illustration of what surveyors may have to contend with is afforded by the experience of Mr. J. N. Wallace, who established the fourteenth base line from the third to the second meridian, and the latter meridian northerly to Saskatchewan river. The need of this survey was imperative; it was expected to prove a difficult undertaking, but the necessity of completing it had been impressed upon Mr. Wallace. Starting from Prince Albert in the latter part of May, difficulties at the beginning were only those usually met with in a bush survey, but after crossing the Saskatchewan, some of the endless muskegs of that northern country were encountered, and then the troubles of the party commenced. Mr. Wallace tried to find a way round, but there was none around these muskegs, and he had to go right through. After floundering nearly three months, in the fall of the year, through these half frozen swamps, he found himself, towards the end of December, at the foot of the Pasquia mountains, a rough stretch of country rising 1,400 feet above Carrot river. Five of his horses were dead, the remainder were rapidly failing, and he was far from supplies. 'We had been,' he says, 'through some hard work in the muskegs, but the experience of getting the line over these hills, or rather mountains, put all else in the shade. Not only had we the deep snow and the rough country, but being on the northerly slope of the mountains, we were exposed to the bitter winds coming in over the vast open areas to the north, and were deprived by the slope of the small amount of warmth in the sun, as it seldom rose, so far as the valleys are concerned, until ten o'clock, and set about half-past one or two.' The survey was finally completed on March 12; its success was due not only to pluck and energy displayed by Mr. Wallace; but also to his excellent arrangements for feeding his pack train and provisioning his party. Incidentally he discusses transportation by dogs and by pack horses, and he indicates the considerations which must guide a surveyor in adopting one or the other mode of transportation.

Another notable example of devotion to duty is furnished by Mr. A. W. Johnson, who is in charge of the surveys in the western half of the British Columbia railway belt. For the last three years, a considerable part of his time has been spent in marking upon the ground the limit of the belt. This line was laid down on the maps at a fixed distance of twenty miles from the railway, and as may well be imagined, it goes over some of the wildest parts of the mountains. The survey of such a line requires steady nerves and continuous hard work. Such luxuries as tents are not to be thought of, and the bill of fare must be reduced to bare necessities. The men take with them only what they can carry on their backs, and the heaviest load is for the surveyor. 'I cannot,' Mr. Johnson says, 'spend months grading trails. People often say to me: "Why do you pack on your back?" I have found that unless I do so, and lead when difficult, dangerous, or dirty work is to be done, the men will not do it either, or if they do, only in a slipshod, half-hearted way.'

Many other instances might be cited showing that the services of surveyors, as a class, deserve hearty appreciation.

The parties were distributed from the eastern boundary of Manitoba to the Pacific coast.

Mr. C. F. Aylsworth, D.L.S., who was making surveys and re-surveys in eastern Manitoba, speaks of the industrial possibilities of Beausejour. He reports that the peculiar quality of the sand in that district is especially adapted for the manufacture of glass. A company of Germans has been formed and a factory has been erected in a place convenient to the sand, which is found in unlimited quantities. Cement blocks and steam-dried white bricks are also manufactured there, and all three industries promise well.

Mr. Wm. Christie, D.L.S., was employed on re-survey work in eastern Manitoba,

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and Mr. W. J. Deans, D.L.S., on similar work as well as on some new surveys in the provinces of Manitoba and Saskatchewan.

Mr. Geo. A. Grover, D.L.S., was at work in Manitoba on re-surveys and the inspection of surveys made under contract. For some years Teulon has been the end of the Stonewall branch of the Canadian Pacific railway, but this year the company is extending the line farther north, intending, Mr. Grover believes, to run eventually to Icelandic river on lake Winnipeg. This should prove a profitable line, for though the country is at present largely broken by marshes and swamps, these should gradually diminish with deforestation, and the soil in nearly all parts is excellent. This locality would seem to be well adapted for mixed farming and dairying, and the proximity of the great and rapidly growing market of Winnipeg would assure the settler good prices for his produce. The Canadian Northern Railway company also intends to extend its line along the shores of lake Manitoba from Oak Point. This also should prove a valuable extension, but there is a wide stretch between lakes Manitoba and Winnipeg that neither road seems desirous of entering, though the reason is not apparent, for it is a fertile country and fairly well settled, particularly when its distance from the railway and the difficulty of road travel are considered. Moreover, this should be a cheap country to build a railway through, there being no great engineering difficulties to overcome.

Oak Point is situated in a park-like piece of country, with oak clumps and prairie alternating, which faces on lake Manitoba. It has great natural beauty and Mr. Grover believes it is soon to be made into a summer resort. This neighbourhood has been settled for some time and the farmers all seem to be doing well. Cream is shipped to Winnipeg in large quantities, which will doubtless increase when better facilities for handling are provided.

Mr. David Beatty, D.L.S., made some correction surveys north of Prince Albert and east of Battleford.

Mr. E. W. Hubbell, D.L.S., was employed on re-survey work and inspection of surveys made under contract. Speaking generally of that portion of the province of Saskatchewan extending from Prince Albert in the north to Willow Bunch in the south, and from Milford in the east to Swift Current in the west, it may be said that of the thirty thousand square miles, twenty-five thousand are excellent agricultural land. It is being rapidly settled by a superior class of immigrants, many of whom may be designated as Canadian-Americans, men born in Canada, who emigrated to the United States, lived there many years, married, became possessed of property, and who now being persuaded that they can better their condition, have sold out and have taken up homesteads in the Canadian west. Mr. Hubbell estimates that, in the above mentioned district, for every square mile now under cultivation there are two hundred square miles of virgin soil.

Mr. W. R. Reilly, D.L.S., was employed on re-survey work in the province of Saskatchewan.

Mr. A. H. Hawkins, D.L.S., was engaged on surveys and re-surveys in the southern part of Saskatchewan and Alberta. On the way to make an examination of the third correction line he passed through Stirling and Lethbridge. Stirling is the centre of a new Mormon settlement and seems to be in a thriving condition. A large beet-root sugar factory at Raymond, some six miles west of Stirling, has created a very profitable industry. Irrigation schemes are being pushed in all directions, and the excellent produce of all kinds testifies to the fertility of the soil when properly watered. As one nears Lethbridge, several large irrigation canals are passed and the country assumes a still more settled aspect. Good buildings, larger stacks of grain and more fences mark the advance of civilization.

Similar surveys were made in central and southern Alberta by Mr. W. F. O'Hara, D.L.S.

Mr. A. W. Ponton, D.L.S., was employed during the early part of 1906 on block outline surveys in northern Alberta. Part of his work was in the vicinity of Lac la

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Biche. The country in this neighbourhood is generally wooded, poplar being found on the high land, and spruce in the swamps. The spruce timber available is sufficient to supply all lumber required for early settlement, but is too scattered for commercial purposes. A portable saw-mill would best meet local requirements. The soil is generally a good clay loam, becoming lighter and more of a sandy loam as the lake shore is approached. Lac la Biche has all the requisites for a summer resort, plenty of fish and game and beautiful scenery.

Mr. H. W. Selby, D.L.S., was in the vicinity of Lesser Slave lake, northern Alberta. The country is well suited for agriculture, but until there is nearer railway communication there will be no great influx of settlers, as there is no outlet for their produce.

Mr. Arthur Saint Cyr, D.L.S., ran some block lines in the Peace River district. In the vicinity of Prairie River Settlement the quality of the soil is all that can be desired, and this section bids fair to become one of the most prosperous in the country. At Smoky river there has been much damage done by fires.

The settlers at Peace River Landing and at Brick's Settlement are at a great disadvantage on account of the scarcity of roads to their hay meadows. Coal is found in many places and the climate is better than that of the country to the south.

Mr. R. W. Cautley, D.L.S., who was surveying block outlines in Alberta, speaks of the great activity of the Edmonton district in railway construction, building, farming and lumbering. This has caused an unlimited and consequently an unsatisfied demand for labour and horses which has raised the wages of one, and the price of the other. In the vicinity of the important and growing town of Athabaska Landing there are several scattered settlements, but there yet remains much land that is suitable for occupation, and there is no doubt that a larger number of settlers will come into this country during the next year or two, particularly as it is served by the best wagon road out of Edmonton and Fort Saskatchewan, namely, the Athabaska Landing trail.

In southern Alberta Mr. A. L. MacLennan, D.L.S., was employed in making subdivision surveys and Mr. C. F. Miles, D.L.S., on survey and re-survey work. In the greater portion of the district traversed, that is, in the wooded country, there is an abundance of game. This wooded portion is the chief hunting grounds for the Stony Indians, who kill deer in great numbers. Unless some restrictions are imposed to stop this indiscriminate slaughter, deer in this district will soon be exterminated. Nearly all the streams are well stocked with fish, the principal varieties being mountain, speckled and bull trout and grayling. There are also plenty of mountain grouse and partridge, and in certain localities a few prairie chicken.

Mr. C. C. Fairchild, D.L.S., was also working in southern Alberta.

Mr. L. E. Fontaine, D.L.S., was employed in southern and central Alberta in making surveys and re-surveys and in inspecting contracts. During the season he travelled over that part of Alberta lying between townships 37 and 52 between the fourth and fifth meridians. Great changes, he notes, have taken place in that district since 1898. Then a farm house or a ranch would be found every thirty or forty miles, but now the traveller is never out of sight of one or the other, and instead of vast wildernesses, beautiful fields of waving grain are now to be seen in every direction.

Mr. L. T. Bray, D.L.S., was engaged in subdivision and re-survey work in southern Alberta.

Mr. G. J. Lonergan, D.L.S., was employed in central Alberta in re-survey work and in the inspection of surveys made under contract. Following the Victoria trail northeast from Fort Saskatchewan, the country passed through is all well settled. Mixed farming is successfully carried on, considerable attention being devoted to hog raising. There is a splendid opening here for a large pork packing establishment. At present there is a small plant, but it is hopelessly inadequate. Contrary to the general idea, Stony plain is not a rough, rocky place. It is level, the soil is a rich sandy loam and it is known to grow the best No. 1 hard wheat in the Edmonton district. This plain was formerly part of the reservation for the Stony Indians, and

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hence its name. At St. Paul de Metis there is a Roman Catholic mission which was started eight years ago by the Rev. Father Therien. They have changed a scrub country into a profitable farm and beautiful garden, and have built a large church, a school and a convent. The mission has a steam thresher, a saw-mill, a shingle mill, a flour mill and a crusher, besides a full supply of farming machinery.

Mr. Jos. E. Ross, D.L.S., during the past season was making surveys in the railway belt, Kamloops district, British Columbia. Near Ashcroft the soil is of such an absorbent nature that irrigation has a tendency to cause slides. At Spatsum the land is stony, hilly and broken, and fit only for grazing. Gypsum deposits occur here, and some development has been made. The valley of Incomappleux river is bounded by mountains on each side. This valley is fit for settlement, with plenty of timber on the higher grounds. Valuable minerals have been found high up in the mountains, but cannot be worked at a profit, owing to the high cost of transportation.

Mr. A. W. Johnson, D.L.S., was in the western portion of the railway belt in British Columbia. During the season he made a re-survey of the townsite of Hope. All that is needed to make this place a resort for tourists, is a railway, because a pleasanter spot for a summer holiday could scarcely be found. There is splendid trout fishing close to the village, mountain climbing and big game shooting for those who care to take the risk of climbing after goats, or the trouble of forcing their way through the thick brush to the high open slides which are the feeding grounds of bears. Another place that would make an ideal summer resort is Chilliwak lake. It would be easy to build a good wagon road up to the lake and then it could be reached in a day from the town of Chilliwak. The fishing is good, the scenery magnificent and there is nearly always a good sailing breeze.

MISCELLANEOUS SURVEYS.

Mr. J. F. Richard, D.L.S., surveyed settlements at Cumberland House, The Pas and Big Eddy on Saskatchewan river. Cumberland House, including the Indian reserve, has about 600 inhabitants, two-thirds at least of which are of Indian origin. The language generally spoken is Cree, although several of the half-breeds understand English, and a few of them understand French. A considerable trade in furs is carried on.

Big Eddy Settlement is situated to the north of Saskatchewan river on the rear line of The Pas Indian reserve. There is no cultivable land unless extensive draining operations are carried out, the country being a plain covered with moss from twelve to twenty-four inches deep. The population, including the Indians, numbers about 500; they profess the Anglican religion. A branch of the Canadian Northern railway running towards Hudson bay will probably reach The Pas during the course of the summer.

Mr. J. B. Saint Cyr, D.L.S., made a survey of the settlements in the neighbourhood of Fort Vermilion, on Peace river. Large tracts are well adapted for farming and ranching; grain paid very well during recent years, the Hudson's Bay company paying as much as one dollar and fifty cents a bushel for wheat. Extensive beds of limestone have been found, as well as large deposits of salt near Salt river. There is a seam of good soft coal at a place called 'The Cliff,' fifteen miles north of Peace River Landing; it is about three to five feet thick. Fish and game are found in abundance.

While making various miscellaneous surveys and supervising some of the arrangements for transport, &c., Mr. P. R. A. Belanger, D.L.S., in the course of the season travelled several hundred miles across the different provinces, and found everywhere an activity greater than at any time in the past. In the Edmonton district the country is filling up fast, although there is still a large quantity of desirable land ready for settlement. This district is an ideal country for farmers from Ontario and Quebec who cannot be content to settle in open country where wood is not found for miles around.

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On his way from Kamsack to the Touchwood hills and Prince Albert, he passed through three Doukhobor villages, Veregin, Buchanan and a village situated about two miles west of Buchanan. The houses are in rows a few feet distant from one another, are built with great symmetry and have a very neat, clean appearance. The Doukhobors, he says, are a very moral, quiet and industrious people, and, notwithstanding their occasional foolish pilgrimages, are undoubtedly desirable settlers. They have already cultivated a large proportion of their land, and their crops rank among the best in the locality.

At a short distance north of Touchwood Hills postoffice, there is a small settlement named Wishart established several years ago on the western edge of Round plain. This is a very rich country, the farmers are all well off and they carry on mixed farming with great success. Mr. Belanger saw there some of the best wheat that was grown in the west last summer. The adjoining land, the Round plain, is, however, mostly vacant, although the land is much the same. This is because speculators have acquired it with scrip and are holding it at a high price.

Mr. R. C. Laurie, D.L.S., made a re-survey of the townsite of South Battleford.

Mr. J. A. Macdonell was engaged in an exploration survey for the purpose of selecting three and a half million acres, a grant to the Dominion government in that portion of the Peace River district of British Columbia lying east of the Rocky mountains and adjoining the province of Alberta.

Mr. J. A. Kirk, D.L.S., made some miscellaneous surveys along Blaeberry creek, in the railway belt in British Columbia. The valley of Blaeberry creek is of no apparent value except for its timber. The soil is not favourable for timber of large size, hence the large cedar is usually hollow, and large healthy trees of any kind are rare. Still the valley produces fair timber, which with proper protection will prove a valuable asset.

Mr. P. A. Carson, D.L.S., continued the triangulation of the railway belt in British Columbia, the main object of this work being to furnish points of reference for the extension of subdivision surveys at a distance from the railway.

Mr. Arthur O. Wheeler, topographer, extended his photo-topographical survey of the Yoho Park in the Rocky mountains. Altogether forty-seven ascents were made and eighty-nine camera stations occupied, from which four hundred and seventy-one plates were exposed. The districts round Mts. Douglas and Drummond furnish a paradise for botanists and those fond of camping amidst beautiful scenery. The locality may be said to be one of the most attractive of the Rocky mountains.

Irrigation surveys were continued under the direction of Mr. John Stewart, D.L.S., Commissioner of Irrigation, Calgary, Alberta.

EXPLORATION SURVEYS.

Four parties under Messrs. J. W. McLaggan, P. G. Stewart, A. D. Moodie and W. Thibaudeau, were detailed to explore the country along the route of the proposed branch of the Canadian Northern railway between Erwood and Fort Churchill, on Hudson bay. This line is to pass through The Pas, the part between Erwood and The Pas being now under construction.

Mr. J. W. McLaggan examined the country between The Pas, Paint lake and Burntwood river.

Messrs. P. G. Stewart and A. D. Moodie explored between Erwood and The Pas, Mr. Stewart being allotted the western portion and Mr. Moodie the eastern portion of this tract of country, while Mr. W. Thibaudeau examined the country lying between Fort Churchill and The Pas.

The object of these surveys was to get a detailed description of the country as to its general character, the nature of the soil, its fitness for agriculture, the value, quantity and location of the timber, the mineral resources and the climate.

Mr. J. W. McLaggan reported on the district between The Pas, Paint lake and Burntwood river. This is a sportsman's paradise. During the trip, he saw ten moose,

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six bears, one deer, one timber wolf, over a dozen lynx, a number of mink and other fur-bearing animals and ducks and geese innumerable. There are spots of good farming land and there should be no difficulty in raising good crops of all the hardy grains and vegetables, but the difficulty would be to make roads from one place to another, as the country between the spots of good land is rough and rocky.

The whole country from Grass river to Burntwood river, with the exception of small areas along the lakes and rivers, has been swept by fire. There is a growth of young timber coming up since the fire, which may be of value in time. As a mineral country there is a wide field for prospectors; Mr. McLaggan saw indications of gold, silver, iron and limestone. The preliminary survey of the railway to Hudson bay has already been made from The Pas to the southeast of Reed lake; he thinks that from there the railway should cross Grass river between Reed and Wekusko lakes, and continuing down the north side of Grass river and Setting lake, pass to the north of Paint lake. This route would take the railway through the part of the country where there would be the most traffic.

Mr. P. G. Stewart explored the region northwest of Etoimami and of the Hudson Bay branch of the Canadian Northern railway to The Pas. All through, the country is well covered with timber of all kinds, but poplar and spruce are most plentiful. He estimates the amount of standing timber available in this tract at about 600,000,000 feet B.M. The country is much the same as that explored by Mr. J. W. McLaggan.

Mr. A. D. Moodie's exploration was along the right of way of the Canadian Northern railway, between Erwood and The Pas. The part first examined was that section lying between Leaf lake on the east, and the Canadian Northern railway right of way on the west. The larger part of this section consists of mossy muskegs sparsely dotted with spruce and tamarack scrub, and of gravel ridges, with spruce and small poplar; it is consequently unfit for agriculture. The poplar is mostly small, and is good only for pulpwood. Spruce suitable for lumbering is scattered. Moose, caribou, bears and smaller fur-bearing animals are abundant.

The general character of the country from the north end of Leaf lake to The Pas and as far as thirty miles east of the grade, which is already constructed to the latter point, is very similar to that of the section just described, except that the timber is of better quality and is more plentiful.

The country lying to the east and north of Little Pasquia river is composed entirely of muskeg with spruce and tamarack scrub. Its character can be judged from the fact that for days together the party was compelled to wade in water to the knees.

The population of The Pas is about five hundred, including Indians. Most of the inhabitants belong to the Church of England, which has a mission under the charge of Mr. Edwards. The village consists of a few half-breed houses, two stores and the mission.

The branch of the Canadian Northern railway to Hudson bay runs through a muskeg country nearly the whole way from Etoimami to The Pas, a distance of eighty-nine miles. The engineers discovered that the muskeg of this particular section rested on a solid foundation of limestone gravel at a depth of three to six feet below the surface, and they claim that once the muskeg is drained a good road-bed will be obtained.

Mr. W. Thibault, C.E., explored the country lying between Fort Churchill, on Hudson bay, and The Pas, on Saskatchewan river.

Churchill harbour has an entrance 2,000 feet wide and vessels drawing thirty-six feet of water may approach to within 200 yards of the west shore, while vessels drawing twenty-four feet may approach to within 150 yards of the east shore. No great difficulty will be experienced in keeping the harbour clear of ice all the year round. Churchill harbour lies between two peninsulas. On the west peninsula, sandstone, limestone and white quartzite are found. On the east peninsula there are splendid building sites and plenty of good limestone for building purposes.

Fort Prince of Wales, at the west of the entrance to the harbour, was built in 1733. The walls are thirty-four feet thick and sixteen feet high. It was originally mounted with forty cannon.

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The present Fort Churchill is situated on the western shore about five miles from the mouth of Churchill river. This is the headquarters of the Hudson's Bay Co.

Timber for fuel is plentiful along the river. Salmon trout and whitefish are to be had at all seasons. Potatoes and vegetables are successfully grown, and good hay is to be had in abundance on both sides of the river. Game of all kinds is plentiful.

Between Churchill and North rivers the ridges are overgrown with small spruce and tamarack, but for the most part the country is level; it is covered with moss and small ponds and is constantly frozen up.

The same description applies to the land between Churchill and Owl rivers.

About one-third of the country from Fort Churchill to The Pas is marsh. The higher lands are covered with spruce and tamarack, suitable only for fuel and pulpwood. No minerals of any kind are to be seen. Water-power is available from Deer, North, Churchill, Nelson, Burntwood and Grass rivers. Whitefish abound in all the lakes, and some trout, pike and sucker are occasionally to be had. Moose and caribou may be seen in fair numbers and also some rabbits, spruce grouse and ptarmigan. The total distance covered by Mr. Thibaudeau on his exploration was 690 miles.

The following is a comparison of the mileage surveyed since 1904:—

	Fifteen months Jan. 1, 1906 to Mar. 31, 1907.	1905.	1904.
	Miles.	Miles.	Miles.
Township outlines.....	1,306	1,591	1,285
Section lines.....	8,962	10,544	24,488
Traverse.....	1,848	1,809	4,441
Re-survey.....	4,948	2,579	7,699
Total for season.....	17,064	16,523	37,913
Number of parties.....	56	46	80
Average miles per party.....	305	359	474

The following table shows the mileage surveyed by the parties under daily pay and by the parties under contract:—

Work of Parties Under Daily Pay.	Fifteen months, Jan. 1, 1906, to Mar. 31, 1907.	1905.	1904.
	Miles.	Miles.	Miles.
Township outlines.....	756	1,008	719
Section lines.....	1,035	939	235
Traverse.....	643	421	223
Re-survey.....	4,815	2,499	2,122
Total for the season.....	7,249	4,867	3,299
Number of parties.....	29	26	22
Average miles per party.....	250	187	150

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Work of Parties Under Contract.	Fifteen months, Jan. 1, 1906, to Mar. 31, 1907.	1905.	1904.
	Miles.	Miles.	Miles.
Township outlines.....	550	583	566
Section lines.....	7,927	9,605	24,253
Traverse.....	1,205	1,388	1,218
Re-survey.....	133	80	2,809
Total for the season.....	9,815	11,656	31,846
Number of parties.....	27	20	57
Average miles per party.....	364	583	559

NOTE.—Owing to the nature of their work, the parties under Messrs. P. A. Carson, R. C. Laurie, J. A. Macdonell, J. W. McLaggan, A. D. Moodie, P. G. Stewart, W. Thibadeau, and A. O. Wheeler, are not included in the statement of mileage for the fifteen months from January 1, 1906, to March 31, 1907.

DESCRIPTION OF TOWNSHIPS.

Descriptions of the townships subdivided have been compiled from the surveyors' reports received during the nine months ending March 31, 1907; they are given as appendix No. 46. The townships are put in order of township, range and meridian, and the descriptions are preceded by a list of all townships described.

Until the year 1893 such descriptions were published from time to time in separate volumes, but these volumes are now out of print and, moreover, are out of date, the last fifteen or twenty years not being included. As many applications are made for such information, the need of revised editions of these descriptions is becoming urgent, and it is hoped that they may be prepared at an early date.

SURVEY OF BLOCK OUTLINES IN THE PEACE RIVER DISTRICT.

The Peace River district having attracted considerable attention during recent years, a short account, such as may properly come within the scope of this report, of the initial surveys within the district may be opportune. A brief description of the method adopted in locating an initial point, with a passing notice of the difficulties encountered in a new field and a statement of the accuracy of the work performed as proven by later surveys, is all that will be attempted. For a description of the country, its resources, its climate, the fertility of its soil and the beauty of its scenery, other sources of information must be consulted.

The position of the sixth initial meridian in longitude 118° affects directly the location of the 120th meridian of longitude, which in the vicinity of Peace river forms the boundary line between the provinces of Alberta and British Columbia. It is, therefore, important that the position occupied by the sixth initial meridian, as surveyed on the ground, be established beyond reasonable doubt. Recent base line surveys in that district show that the posts on this meridian are about sixteen chains too far south, and the whole line about five chains too near to the fifth meridian.

This difference arose in the traverse survey by which an initial point on the sixth meridian was first established, but was not discovered until the spring of 1905, when the survey of the nineteenth base line between the fifth and sixth meridians was completed, affording the first check on the position of the sixth meridian.

The inception of the regular surveys in the Peace River district goes back to 1882, when it was decided to establish some block outlines. For this purpose a portion of the sixth initial meridian had first to be located. The nearest Dominion land

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survey line, at that time, was the fifth meridian, which, during the season of 1882 had been produced north across Athabaska river to the north boundary of township 71. The position of the sixth meridian was established by a cross country traverse from a point on the fifth meridian near its intersection with Athabaska river.

Mr. Wm. T. Thompson, D.T.S., who was entrusted with this survey, left Edmonton with his party on September 22, 1882, travelling by pack trail towards Lesser Slave Lake settlement, until the Pembina river was reached. At this point two scows were constructed of spruce lumber made by whip-sawing the large timber found in the river valley. The outfit and supplies were conveyed in these scows down the Pembina and Athabaska rivers to the mouth of Lesser Slave river, and up this to the foot of the lake. Here a number of sets of observations for latitude by transits over the prime vertical were taken by Mr. Thompson while waiting for ice to form before proceeding with the survey.

Early in December the geodetic traverse was commenced from the foot of Lesser Slave lake and continued easterly through the most favourable country. The general course of the river was followed for a distance of thirty miles to the junction of Lesser Slave and Athabaska rivers, where a point was established to be connected later with the fifth meridian by Mr. W. Ogilvie, D.L.S., when his survey of that line should cross Athabaska river. This point was indicated by a blazed tree marked 'Station O.' The traverse line was then run westerly across the lake and continued through the most open country by way of Stinking lake to Smoky river, where further observations for latitude were made. Care was taken to keep the line as nearly as possible in an east and west direction and the alignment was checked by frequent observations for azimuth.

From the foot of Lesser Slave lake to this point all transportation was necessarily by means of dog trains furnished by the natives, who had a considerable settlement at the head of the lake. Spring overtook the party at the crossing of Smoky river, and the method of transporting supplies which had been of such service during the winter months had to be abandoned. The dog trains were sent back to the lake and pack horses procured for bringing in supplies and moving the outfit.

In the meantime Mr. Ogilvie had established a connection between the fifth meridian and the point previously marked at the mouth of Lesser Slave river by Mr. Thompson. This point was found to be 186.03 chains west and 55.08 chains north of the northeast corner of section 13 in township 71, range 1, west of the fifth meridian. On receipt of this information Mr. Thompson continued his traverse line westerly the required distance to reach the sixth meridian. The differences of latitude and longitude between the initial and terminal points of the traverse line were carefully computed by means of geodetic formulæ and the latitude checked by further observations of transits over the prime vertical. The mean of four nights' observations made the latitude of the terminal point nearly seven seconds less than the latitude computed from the data furnished by the traverse line. Owing to the proximity of Birch hills to the north and the valley of Smoky river to the south, the location was not considered favourable for the determination of the latitude, which might be affected by abnormal deviations of the plumb line. As cloudy weather prevented observations later at more favourable points on the production of the meridian northerly, only a slight correction was made to the computed latitude before permanently planting the posts on the meridian. Practically the meridian was established from the traverse alone, no use being made of the latitude observations.

It is to be regretted that Mr. Thompson was not favoured with better weather so that a number of observations could have been taken at points suited for the accurate determination of the latitude. A difference of 16 chains in the position of the posting on the meridian represents a difference of 10 seconds in latitude. With good weather and a favourable location it is practically certain that the surveyor, by exercising his usual precautions, would have very materially reduced this discrepancy. Even then, had he trusted his latitude observations, the error would have been re-

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duced to a little over five chains. The position in longitude of the meridian line checks fairly close with the measurements made on the different base lines which have since been completed between the fifth and sixth meridians. According to the twentieth base line, which for some distance passes through the same locality as the traverse line, the position of the sixth meridian differs from its theoretic location by only 1.69 chains. Such agreement reflects credit on the chain-bearers engaged on the traverse.

The linear measurements were made by means of a steel band tape; the observations for azimuth and latitude and the production of the line were effected with a six-inch transit theodolite. When it is remembered that the length of the steel band tape is affected directly by the temperature and varies from other causes, that the surface irregularities and unequal elevation of the country, as well as the personal errors of the chain-bearers are factors which affect the accuracy of the surveyor's measurements, but the value of which cannot be satisfactorily determined, the result, in respect to longitude, is very creditable.

During the progress of the survey Mr. Thompson's assistant made a micrometer survey of Lesser Slave river and lake, ascertaining also the leading features of the adjacent country.

The fifth and sixth meridians are now connected by five consecutive base lines, which taken together, furnish the best available evidence as to the position which the sixth initial meridian occupies with respect to the 118th meridian of longitude with which it theoretically should coincide. The sixteenth base line was run by R. W. Cautley, D.L.S., in the summer of 1904, and winter of 1905; the seventeenth was surveyed in three sections by A. Saint Cyr, D.L.S., in 1904, A. Driscoll, D.L.S., in 1905, and A. Saint Cyr, D.L.S., in 1906, respectively; the eighteenth was also surveyed in three sections by A. Saint Cyr, D.L.S., in 1904, J. N. Wallace, D.L.S., in 1905, and A. Saint Cyr, D.L.S., in 1906, respectively; the survey of the nineteenth was commenced by E. Bray, D.L.S., in 1904, and completed by A. Saint Cyr, D.L.S., in 1905, while the twentieth was run by H. W. Selby, D.L.S., in 1905, with the exception of the most westerly eleven miles, which had been previously surveyed by C. C. Fairchild, D.L.S.

The closings of the different base lines show the sixth meridian as located on the ground, to be somewhat east of its theoretic position, and the posting thereon to be too far south. The following table summarizes the evidence furnished by these lines:—

Base line.	Mer. too far east.	Posting too far south.
16 th.	8.78 chs.	15.24 chs.
17 "	4.85 "	17.00 "
18 "	7.14 "	15.77 "
19 "	3.02 "	18.44 "
20 "	1.69 "	16.41 "

A number of base lines have also been run west from the sixth meridian, two of which have been established as far as the boundary between Alberta and British Columbia. Various other outline surveys, as well, have been projected within the district, so that the way is now fairly prepared for the prosecution of subdivision work in any locality where such surveys may appear desirable.

It is the intention to move all the posts to correct latitude when the subdivision surveys are proceeded with.

A diagram showing the closings on the base lines between the fifth and sixth meridians accompanies this report.

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THE WESTERN BOUNDARY OF THE CANADIAN PACIFIC RAILWAY BELT IN BRITISH COLUMBIA.

The Settlement Act of 1883 described the Canadian Pacific Railway belt as follows:—

‘The public lands along the line of the railway before mentioned wherever it may be finally located to a width of twenty miles on each side of said line as provided in the order in council, section 11, admitting the province of British Columbia into confederation.’

In the Dominion order in council, approved on May 27, 1887, the western boundary of the belt is described as follows:—

‘Commencing at the intersection of the international boundary with the waters of Semiahmoo bay, a branch of Boundary bay, an arm of the Pacific ocean; thence westerly and northerly following the shore of said Semiahmoo bay and also of Mud bay, another branch of said Boundary bay, to the easterly limit of a road known as Mud Bay road; thence northerly following the said limit of said road to the southern bank of Fraser river; thence northerly to the point where the easterly limit of the north road touches the north bank of Fraser river; thence northerly following the said limit of said north road to the southerly shore of Burrard inlet; thence north-westerly to Pt. Roche, being a point where the westerly shore of the north arm of Burrard inlet joins the northerly shore of the main arm of Burrard inlet; thence northerly following the westerly shore of the said north arm of Burrard inlet to the most northerly part of the same; thence due north to the north boundary of township 7, range 7, west of the seventh initial meridian according to the Dominion Lands system of surveys adopted in the survey of the railway belt in British Columbia.’

By the order in council approved on March 29, 1895, an agreement was to be concluded with the government of the province of British Columbia. Clause 1 of said order reads as follows: ‘The province shall accept as the boundary of the railway belt the limits laid down and marked out by the Dominion order in council approved on May 27, 1887, and by the map attached thereto (a copy of which is hereto annexed), or the nearest township line to the boundary of the belt which would be found by actual admeasurement, as may be found by the Minister of the Interior most convenient.’

In the order in council of the British Columbia government, dated December 6, 1895, clause 1 reads as follows:—

‘The province shall accept as the boundary of the railway belt the limits laid down and marked out by the Dominion order in council, approved on May 27, 1887, and by the map attached thereto (a copy of which is annexed to the said report of the Privy Council approved by His Excellency on March 29, 1895), or the nearest section line to the boundary of the belt which would be found by actual measurement as may be found by the Minister of the Interior most convenient.’

In a letter dated June 23, 1896, the Deputy Commissioner of Lands and Works, Victoria, B.C., was notified by the Deputy Minister of the Interior that it had been decided to adopt for the boundary the nearest section line to the boundary of the belt which would be found by actual measurement, and diagrams showing the section line in question were inclosed.

Attention was drawn to the fact that the boundary shown upon the diagrams stops at the creek flowing from the north into the head of the north arm of Burrard inlet, leaving the western boundary of the belt undefined, therefore, it appeared that another notification to the provincial government under the provisions of the provincial order in council of December 6, 1895, would be necessary to fix the western boundary of the belt.

In a letter dated April 9, 1903, the Deputy Commissioner of Lands and Works, British Columbia, was asked if the province would agree to accept for the western boundary the line described in the order of His Excellency the Governor General in Council, of May 27, 1887, to which a reply was received as follows:—

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'In reply I beg to say that the boundaries referred to in that order, with the exception of that part which follows the westerly shore of the north arm of Burrard inlet, have always been understood by this government as agreed to between the province and the Dominion; but instead of the westerly shore of the north arm of Burrard inlet we have always considered the eastern shore of the north arm to be the boundary line, and we have sold and otherwise alienated islands lying in the said north arm. I, therefore, beg to suggest that the description in the order in council above referred to may be altered so as to make the easterly shore of the north arm the boundary between the provincial and Dominion lands.'

By the order in council of July 8, 1904, the eastern shore of the north arm of Burrard inlet was accepted as part of the western boundary of the railway belt, subject to the ratification of parliament and of the legislature of British Columbia, the said boundary to be as follows:—

'Commencing at the intersection of the international boundary with the waters of Semiahmoo bay, a branch of Boundary bay, an arm of the Pacific ocean; thence westerly and northerly following the shore of said Semiahmoo bay and also of Mud bay, another branch of said Boundary bay, to the eastern limit of a road known as Mud Bay road; thence northerly following the said limit of said road to the southern bank of Fraser river; thence northerly to the point where the eastern limit of the north road touches the north bank of Fraser river; thence northerly following the said limit of said north road to the southern shore of the main arm of Burrard inlet; thence due north to the northern shore of the said main arm; thence westerly following upon the said northern shore of the main arm to the eastern shore of the north arm of Burrard inlet; thence northerly following upon the eastern shore of the said north arm to the most northerly point of the peninsula between Bedwell bay and the said north arm; thence northeasterly on a straight line to the point where the northern boundary of township thirty-nine, west of the coast meridian intersects the eastern shore of the north arm of Burrard inlet; thence northerly following upon the said eastern shore to the mouth of Mesliloet river, a stream flowing from the north into the head of the said north arm; thence northerly along the middle of the main channel of the said Mesliloet river to the point of its intersection with the north boundary of township seven, in range seven, west of the seventh meridian, according to the Dominion Lands system adopted in the survey of the railway belt in British Columbia.'

In a report of a committee of the executive council of the government of British Columbia, approved by the Lieutenant Governor on August 13, 1904, it is stated that 'The committee observe that the recommendation of the Minister of the Interior that, subject to the ratification of parliament and of the legislature of British Columbia, the eastern shore of the north arm of Burrard inlet be accepted as part of the western boundary of the railway belt, is approved.

'The committee advise that the Dominion government, be informed that the provincial government approves and accepts the recommendation of the minister.'

The Secretary of State called the attention of the Lieutenant Governor of British Columbia to the fact that the provincial minute, approved on August 13, 1904, merely accepted the eastern shore of the north arm of Burrard inlet as part of the western boundary of the railway belt, not the whole western boundary as described by metes and bounds in the minute of the Privy Council approved by the Governor General on July 8, 1904.

The report of a committee of the executive council, approved by the Lieutenant Governor on March 3, 1905, was, therefore, substituted for that of August 13, 1904. This accepts the eastern shore of the north arm of Burrard inlet as part of the western boundary of the railway belt and approves and confirms the said boundary as further defined in the order in council of July 8, 1904.

In a report of the committee of the Privy Council, approved by the Governor General on July 15, 1905, it was recommended that, as the government of the Domin-

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ion and of the province of British Columbia had agreed to accept a certain line for the western boundary of the Canadian Pacific Railway belt, the Minister of Justice be asked to have prepared for submission to parliament at its next session a Bill containing the necessary provisions for an Act to ratify the boundary in question in so far as the Dominion of Canada is concerned, and it was further recommended that the Lieutenant Governor of British Columbia be asked to have the necessary action taken by his government to ratify such boundary in so far as the province of British Columbia is concerned, by an Act of the legislature of that province.

In a report of a committee of the executive council, approved by the Lieutenant Governor on August 10, 1905, it was recommended that the Attorney General be requested to prepare a Bill to be laid before the legislature at its next session to ratify the boundary in question so far as the province is concerned. Accordingly a Bill was introduced, but when it came up for discussion it was pointed out that the Mud Bay road mentioned in the order of the Governor General in Council of July 15, 1905, does not extend to Mud bay, and at its northern end joins what is known as the Yale road, which leads to Fraser river at Brownsville, opposite New Westminster, and that instead of extending to the north bank of Fraser river, the north road, mentioned in said order, ends at the northeasterly limit of the city of New Westminster. To meet this difficulty it was considered necessary to make some amendments in the description of the boundary contained in the said order of the Governor General in Council, and the Dominion government having signified its consent to the changes, the Bill received the sanction of the Lieutenant Governor of British Columbia on March 12, 1906.

The description of the western boundary of the railway belt as ratified by the Provincial Act is as follows:—

‘Commencing at the intersection of the international boundary with the waters of Semiahmoo bay, a branch of Boundary bay, an arm of the Pacific ocean; thence westerly and northerly, following the shore of the said Semiahmoo bay, and of Mud bay, another branch of the said Boundary bay, to a point on the shore of Mud bay at the intersection of the west boundary line of township two, New Westminster district, with the waters of said Mud bay; thence north along the said west boundary of township two, to the northwest corner of said township two; thence northerly along the eastern side lines of the Mud Bay (or Scott) road, and the Yale road, to the south bank of Fraser river at Brownsville; thence northerly, crossing Fraser river to a point on the north bank of the said river where the eastern side line of the north road produced south would intersect the north bank of Fraser river; thence north to the eastern side line of said north road; thence north along the said eastern side line of said north road to its intersection with the south shore of Burrard inlet; thence north to the north shore line of Burrard inlet; thence westerly and northerly following the shore line of Burrard inlet to the most northerly point of the peninsula between Bedwell bay and the north arm of Burrard inlet; thence northeasterly on a straight line to the point where the northern boundary of township thirty-nine west of the coast meridian intersects the eastern shore of the north arm of Burrard inlet; thence northerly, following upon the said eastern shore to the mouth of the Mesilloet river, a stream flowing from the north into the head of said north arm; thence northerly along the middle of the main channel of the said Mesilloet river to the point of its intersection with the northern boundary of township seven, in range seven, west of the seventh meridian, according to the Dominion Lands system adopted in the surveys of the railway belt in British Columbia.’

A Bill to ratify the agreement between the government of the Dominion of Canada and the government of the province of British Columbia respecting the western boundary of the railway belt received the sanction of the Governor General on March 22, 1907.

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ASTRONOMICAL FIELD TABLES.

The astronomical field tables, as described in the report of 1906, are still being issued. These tables were formerly set up in type and printed in the ordinary way, but it was difficult to obtain them from the printers in time for issue to the surveyors. Inasmuch, however, as a great deal of the matter contained in the tables is the same from year to year, forms containing all those parts which never vary have been made, so that when a new set of tables is required, only those parts which vary have to be added to the forms. The forms themselves, as well as the variable data to be added, are stamped by means of type, and the titles, footnotes, &c., are printed by a small handpress and pasted on the form in the proper place. The finished table is then reduced and printed by photo-zincography, thus avoiding all delays in printing.

The diagram of the altitude and azimuth of the pole star, as described in the report of 1906, is issued periodically with the field tables.

A star map is now being constructed for the convenience of observers for latitude. It will facilitate the selection of pairs of stars for Talcott's method.

IMPROVEMENT OF SURVEYS.

The improvement in execution of fieldwork, mentioned in previous reports, is well illustrated by a remark made by one of our surveyors who was engaged in re-tracing old surveys and afterwards in making an inspection of some recent subdivisions. He writes: 'To change from retracing old lines run twenty years ago to inspecting present day contract work is, I fear, not in the interest of rigid inspections. There has been such an improvement, not in any particular, but in every detail of the surveys made in this country in the past twenty years that one would hesitate to speak of them as being the same class of work. In no way could the advantage of the numerous modifications in the Manual and in the field instruments used be more markedly illustrated than by this change which I was forced to make this season. The lines examined in contracts of 1906 were straight, the chainage good and the corners well marked, none of which could be said, as a rule, of the more ancient surveys in this country.'

CORRESPONDENCE.

The correspondence consisted of:

Letters received.. . . .	7,300
Letters sent.. . . .	8,209

The staff consists of the secretary, one clerk, two stenographers and typewriters and two messengers.

ACCOUNTS.

The accountant's record shows:

Number of accounts dealt with.. . . .	493
Amount of accounts.. . . .	\$515,040
Number of cheques forwarded.. . . .	1,896

The staff consists of an accountant and an assistant accountant.

OFFICE STAFF.

A list of the office staff of the Topographical Surveys Branch at Ottawa is given in appendix No. 11.

A number of changes have taken place during the nine months ending March 31, 1907. In the Metcalfe Street office Mr. Percy Wilkinson has been appointed assistant accountant, and J. O'Leary messenger in place of F. T. Ellis, who was transferred to

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another branch. Mr. Geo. H. Watt, chief of the first division, has resigned to take a survey contract. Messrs. H. G. Barber, A. J. Elder, W. T. Green, F. W. Rice, E. E. D. Wilson and W. E. Weld have been absent all or part of the time, acting temporarily as assistants to surveyors. Mr. P. A. Carson, who is in charge of the trigonometrical survey, spent the summer in British Columbia. Miss G. B. Campbell and Messrs. H. A. Mackenzie, C. C. Smith, Wm. Crawford and H. L. Chilver of this office, and Messrs. M. W. Sharon and S. B. Roach, of the geographer's office, have resigned. Mr. L. J. Gleeson has been detailed to another branch and Mr. F. H. Mackie has been transferred to the office of the chief astronomer. Mr. H. J. Higgerty has been transferred from the lithographic office to the Timber and Mines Branch.

The additions to the staff during the past nine months are: A. Brown, E. L. Burkholder, J. C. Ball, E. E. Brice, C. Fitzgerald, J. B. Hutton, R. V. Heathcott, M. Kimpe, J. F. Moran, J. A. Macdonald, F. L. Marriott, J. W. Rochon, H. J. Smith, R. O. Spreckley, A. Tremblay, J. N. Goodall, who was re-appointed, and P. F. X. Genest, who was transferred from the Yukon office. Mr. E. Villeneuve was changed from the lithographic office to the office of the chief draughtsman. Those appointed to the lithographic office are: S. Boyle, J. Gagnon and S. H. Shore; the latter was recently transferred to the office of the chief draughtsman. Messrs. W. Anderson, W. Blue, J. Beveridge and F. B. Inkster were appointed to the geographer's staff; Mr. E. G. Ouimet to the photographer's staff, and Mr. N. Landry to the survey records office as messenger.

OFFICE OF THE CHIEF DRAUGHTSMAN.

A summary of the work executed in the chief draughtsman's office is given as appendix No. 6.

This part of the branch is divided into five divisions.

First Division—Instructions and General Information.

In this division instructions are prepared for all surveys to be performed in the field. When the surveyor has been selected, instructions are prepared for him giving any directions that may be necessary in connection with the survey. In the case of parties under day pay, the surveyor is also instructed as to the size of party, the place of organization, the nature of the transport outfit and the rate of pay to employees. Outline sketches are furnished to him showing the monuments, bearings and distances of the lines of Dominion land surveys already established in the vicinity of his work. He is also supplied with maps or plans of all Hudson's Bay Company reserves and Indian reserves in the neighbourhood. Field books, astronomical field tables, stationery, forms for accounts, statutory declarations, &c., are also furnished. During the nine months ending March 31, 1907, instructions were issued for eighty-six survey parties, involving the preparation of 798 sketches, and 328 maps and tracings.

In this division all returns of survey from the surveyors are received. They are dated, stamped, and posted in the various registers under the name of the surveyor. They are then sent to the second division for examination. The receipts during the nine months were 630 progress sketches, 390 books of field notes, 169 plans, 56 timber reports and 382 statutory declarations. After examination and the compilation of the plans, the books of field notes are returned to this division and forwarded to the survey records office. During the nine months 643 field books and the returns of 67 miscellaneous surveys were placed on record. Entries are also made in the registers for all township and other plans printed. Plans of 520 townships, 4 townsites, 49 miscellaneous surveys and 52 sectional sheets were printed during the nine months.

When the progress sketches sent in by the surveyor have been examined and found satisfactory, preliminary plans for the townships are issued, four copies for each township. One copy is placed on file in this office and one each furnished to the

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survey records office, the Land Patents Branch and the land agent. The object of these plans is to allow of the land being opened for entry at once, without waiting for the final examination of the surveyor's returns and the issue of the official plan. Preliminary plans of 179 townships were issued during the nine months.

At the close of each month a list of the surveys approved during the month is forwarded to the secretary of the department. Every six months another list of the whole townships, fractional townships and partially surveyed townships, the surveys of which have been approved, is sent to the secretary. Under the provisions of sub-clause 7 of clause 22 of the Dominion Lands Act, the governor of the Hudson's Bay company is to be notified of the surveys approved, and the list is for the purpose of giving the notice called for by the Act.

Numerous communications on miscellaneous matters pertaining to surveys are dealt with in this division. To reply intelligently to many of these questions requires days of search for information among various sources, frequently in different branches of the department. During the nine months 743 such communications were dealt with, involving the preparation of 258 sketches, maps, &c.

Second Division—Examination of Surveyors' Returns.

A detailed description of the system of examining and dealing with surveyors' returns was given in the annual report for the year ending June 30, 1906. The same system is still in force, with some few improvements in the minor details.

The room formerly occupied by the geographer and his staff on the second floor of the Metcalfe Street office, having been vacated, the partition between it and the room occupied by the compiling and examining staff, and also an unused elevator shaft were removed, thus affording increased accommodation and better working facilities. Temporary quarters were procured in the Orme building on Wellington street, while this work was in progress, and the disadvantage of part of the staff being removed from registers, plans of former surveys and other sources of information, retarded the work to some extent. In addition to the removal of the partition, a ventilating system was installed, this being easily accomplished by utilizing part of the space formerly occupied by the elevator shaft. The value of this provision for ventilation is inestimable, as a plentiful supply of good fresh air is now available, whereas before, no provision whatever was made for ventilation.

The work has been materially increased by the passage of an Act respecting roads and road allowances in the provinces of Saskatchewan and Alberta (section 6 of chapter 100 of the Revised Statutes of Canada), which provides that where a survey is made of a road diversion, a duplicate copy of the plan of such survey, approved by the chief engineer of the Department of Public Works of such province, shall be forthwith transmitted by the said Department of Public Works to the Surveyor General, who, within one month from the receipt of it by him, may require the plan of such survey to be withdrawn from the land titles office by the Department of Public Works of such province.

Before patents issue for Dominion lands required by railway companies for the right of way of their lines, the plans of such railways must be examined and approved by the Surveyor General. A large number of these plans have accumulated and their examination involves considerable work. Although some progress has been made in re-issuing township plans out of print, the number of plans of which reprints are required has increased rather than diminished during the past nine months. The demand for township plans has become so great, that the stock of those issued years ago, of which only a small edition was printed, soon became exhausted. Larger editions are now printed, so that unless on account of additional surveys, plans recently issued are not likely to require re-issue for many years to come.

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The work of this division during the past nine months is as follows:—

Plans compiled..	409
Subdivision returns examined..	813
Outline returns examined..	123
Miscellaneous survey returns examined..	210
New editions of township plans..	72
Progress sketches examined—contractors..	205
Progress sketches examined—day men..	270
Memoranda sent to surveyors..	329
Memoranda received from surveyors..	342

Third Division—Drawing for Reproduction.

The third division of the draughting staff is engaged chiefly in making finished copies of township and other plans for reproduction by photo-zincography or lithography. During the nine months 527 plans of townships were prepared for printing. For part of this period, while the offices were being renovated, the staff was divided, a number of the draughtsmen remaining at the office on Metcalfe street, while the others were accommodated in temporary quarters on Wellington street. This separation of the staff impeded the progress of the work.

Seventy-nine drawings and plans of a miscellaneous nature were undertaken. Some of the most important of these were the astronomical field tables for the use of surveyors. The present method of preparing these and also the new star map, is described under a separate heading.

A map in colours, showing the route of the proposed Hudson Bay branch of the Canadian Northern Railway, was compiled and printed. This map shows the routes of explorers who recently visited the district, the main features of the country through which the railway will run, and the saving in rail transportation from the western provinces.

The original plans for photo-zincographing are carefully filed away; when new editions of any of them are required, it is only necessary to add the information obtained from later surveys and to photograph them again.

An improvement has been made in the attachment used in the stamp, for holding the type, while stamping a plan. The old holder (see fig. 1) consisted of a solid frame,

Fig. 2

Fig. 1.

cut out in the front to receive the type, with a horizontal thumb screw passing through one side, by means of which the type was held securely in place. This necessitated the use of quads or other small pieces of metal, in order to fill up the extra space in the holder, after the type had been placed at the centre. Considerable time

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was required to adjust each setting of type and quads; also the action of the end of the thumb screw against the soft metal of the quad soon wore it away and created a tendency for the screw to work out of line, enlarging the threaded hole in the holder.

The new holder (see fig. 2) consists of a one-piece frame, having the front shaped out to receive two movable jaws. These jaws have each a projection on the back which slides in a slot in the back of the holder. Through these projections and in the rear of the holder, passes a thumb screw having a bearing at its centre, half in the back of the holder and half in a small cap attached to the back of the holder by screws. This bearing being smaller than the body of the threaded parts of the screw and being situated in the centre of the holder, keeps the screw from moving laterally. One-half of the screw is threaded with a right-hand thread, the other half with a left-hand thread, the holes in the movable jaws being also threaded right-hand and left-hand. The result of this arrangement is that when the thumb screw is turned in one direction the jaws open away from the centre of the holder; when it is turned in the opposite direction the jaws move towards the centre and are capable of coming together at that point. They can hold the thinnest object securely, and whatever is held between them is always in a central position in the holder, and the use of quads for this purpose is done away with.

For the colouring of maps and plans, an air brush has been procured. The air brush is especially useful for colouring photographic enlargements of maps, as the paper used in photographing is often of such a character that it is impossible to put on an even tint in the ordinary way.

Fourth Division—British Columbia Surveys.

Most of the surveys in British Columbia were made by the regular surveyors, Messrs. J. E. Ross and A. W. Johnson. Both worked in winter, as well as in summer, in order to take advantage of weather conditions favourable to surveying operations in the various localities.

In addition to the work of the regular surveyors, a few returns have been received of surveys made for private individuals and of other small surveys.

The British Columbia section of the staff which, for three years, occupied quarters on Sparks street separated from the main office, was this year transferred to the space in the Surveyor General's office formerly occupied by the geographer's staff. This facilitates the work of the staff, the returns and information required for reference being more readily accessible.

The British Columbia surveyors remained so long in the field that their returns were somewhat delayed, and those received entailed more work than usual. As most of the traverse surveys in British Columbia were made for the purpose of establishing section corners and land boundaries, this portion of the work, which will this year contain well over one thousand courses, has to be carefully checked by latitudes and departures.

Forty-five township plans have been compiled, and three hundred and four miscellaneous plans and tracings have been made.

Fifth Division—Mapping.

The work of this division is the compilation and drawing of any maps that may be required. The staff has been engaged principally on the 'sectional sheets,' adding new surveys and other information and preparing them for new editions. Much new compilation has been added to the sectional sheets covering the railway belt in British Columbia so as to show the topography, not only within the railway belt, but also outside of it to the full size of the sheet. The sheets which extend over the west boundary of Alberta into British Columbia are also being added to, in the same way.

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The compilation of the surveys of mineral claims in the Yukon Territory, showing their position on the general map on a scale of 40 chs. to an inch, has been kept up, but the number of lots so recorded has been very small compared with previous years.

SURVEY RECORDS' OFFICE.

A large portion of the survey records staff has been employed copying plans which have been out of print, and which were required by agents, land guides and companies in placing settlers on their lands.

Homestead maps, on a scale of one mile to an inch, showing the homesteads open for entry in the western provinces, have been completed and forwarded to the different sub-agents.

The amount of correspondence necessary to supply the largely increased demand for township plans was, on an average, between twenty-five and thirty letters per day.

The plans and files in connection with reservations of right of way for roads and railways in the provinces of Manitoba, Saskatchewan and Alberta, have greatly increased the work of this office. All these plans and files are recorded here. Every railway right of way plan is on file and the reservations for the right of way in the lands affected are noted. The correspondence in this connection, averaging between fifteen and twenty letters per day, goes through this branch.

The Eclipse Manufacturing company completed the cases, and finished all the other changes necessitated by their removal to their new quarters in the Canadian building. The printed plans of the parishes, settlements and town plots, were removed to their new places and re-indexed; this new arrangement does much to economize the time required for finding them.

A complete index of all the plans west of the fifth meridian, showing the character of the survey and the name of the surveyor for all original plans, has been compiled and has proved a valuable aid to ready reference.

The increase of work during the year has been so large that it is only by using the greatest care in indexing and arrangement that the present staff is able to keep pace with it.

PHOTOGRAPHIC OFFICE.

In presenting the report of the photographic office, it is interesting to note that the total amount of work executed during the nine months exceeded that executed during the twelve months ending June 30, 1906.

There is a large increase in the number of township plans, over one hundred having been reproduced in the month of January alone.

The dry plate work and the bromide enlarging have also greatly increased.

Hitherto the Geological Survey parties have, to a large extent, employed sketching for their surveys, but now they are beginning to use photography, which they find quicker and more satisfactory. Last season only one of their parties used photography, while this season it is expected that four or five will be equipped with the necessary photographic outfits. From the negatives, bromide enlargements are made in this office. This greater use of photography is the cause of the large increase in the number of bromide enlargements.

Considerable time has been spent on special work. The photo-lithographing of a section of Nelson river showing the proposed Hudson Bay railway, is a fair example of the use that can be made of photography in map making. This map was enlarged from a thirty-five mile scale to a twenty-five mile scale. Another interesting piece of work was the enlargement of part of Alberta, Saskatchewan and the Northwest Territories, from a thirty-five mile scale to a twelve mile scale. This work, which occupied only one week, would take at least three months if done by draughting.

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The staff consists of one photographer in charge, one general photographer with three assistants, and one photo-lithographer and photo-engraver with two assistants.

Besides the development, printing and enlargement of the views taken by surveyors in the field, they have to copy, reduce and enlarge to proper scale the plans and maps used in compilations, to photograph the plans and maps sent in for reproduction and to prepare zincplates or transfers of the same. The photographic work of the Geological Survey Department has also been done here. A schedule of the work executed is given as appendix No. 9.

LITHOGRAPHIC OFFICE.

There has been no change in the method of doing the work in this office.

The statement of the work executed, given as appendix No. 10. to this report, shows a decrease in the number of maps printed but a decided increase in the number of the township plans.

The number of the staff is the same as last year; it consists of one foreman, one transferer, one power press printer and one press feeder.

BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS.

The regular annual meeting of the board was held at Ottawa, beginning on the second Monday in February, 1907 (February 11), as directed by clause 101 of the Dominion Lands Act, and was continued until March 2. Special meetings were held on July 19, 1906, and March 21, 1907.

During the February meeting examinations were held simultaneously in Ottawa, Toronto, Winnipeg and Calgary. Professor L. B. Stewart, D.T.S., of the School of Practical Science, presided at the examination in Toronto; Mr. J. Lonsdale Doupe, D.L.S., in Winnipeg, and Mr. A. O. Wheeler, D.L.S., in Calgary.

It had also been arranged to hold a special examination at the same time in Vancouver, under Mr. E. B. Hermon, D.L.S.; but the candidates did not present themselves.

Fifteen candidates passed the examination for admission as articled pupil, as follows:—

- M. H. Baker, St. Thomas, Ont.
- T. W. Brown, Alberton, Ont.
- L. S. Cokely, Lethbridge, Alta.
- A. S. Cram, Ottawa, Ont.
- G. H. Ferguson, Toronto, Ont.
- L. F. Heuperman, Edmonton, Alta.
- W. G. McElhanney, Ottawa, Ont.
- E. W. Murray, Seaforth, Ont.
- J. L. Rannie, Toronto, Ont.
- A. Roger, Ottawa, Ont.
- A. H. D. Ross, Ottawa, Ont.
- Alan Stewart, Ottawa, Ont.
- A. G. Stuart, Montreal, P.Q.
- A. H. Swinburn, Ottawa, Ont.
- E. O. Wheeler, Calgary, Alta.

Fourteen candidates passed the final examination for admission as surveyor, as follows:—

- N. A. Burwash, Toronto, Ont.
- C. A. Chilver, Walkerville, Ont.
- P. C. Coates, Toronto, Ont.

S. R. Crerar, Toronto, Ont.
 C. H. Fullerton, New Liskeard, Ont.
 P. Gillespie, Toronto, Ont.
 W. T. Green, Ottawa, Ont.
 G. B. McColl, Winnipeg, Man.
 D. H. Nelles, Ottawa, Ont.
 D. T. Townsend, Toronto, Ont.
 J. E. Umbach, Ottawa, Ont.
 W. H. Waddell, Hamilton, Ont.
 J. Waldron, Pine Grove, Ont.
 E. W. Walker, Regina, Sask.

Oaths of office and of allegiance and bonds for the sum of one thousand dollars each, as required by clause 115 of the Dominion Lands Act, were received from eleven candidates who had previously passed the necessary examinations for commissions as Dominion land surveyors and had complied with the other requirements of the Act.

Ten commissions as Dominion land surveyors were issued, as follows:—

E. R. Bingham, Toronto, Ont.
 N. A. Burwash, Toronto, Ont.
 C. A. Chilver, Walkerville, Ont.
 S. R. Crerar, Toronto, Ont.
 W. T. Green, Ottawa, Ont.
 J. D. McLennan, Ottawa, Ont.
 G. B. McColl, Winnipeg, Man.
 D. H. Nelles, Ottawa, Ont.
 D. T. Townsend, Toronto, Ont.
 J. E. Umbach, Ottawa, Ont.

Every Dominion land surveyor is required by clause 126 of the Dominion Lands Act, to be in possession of a subsidiary standard measure furnished by the secretary of the board of examiners. Nine such standards were issued during the year.

A list of surveyors who have been furnished with standard measures up to March 31, 1907, will be found in appendix No. 3.

The correspondence of the board amounted to:

Letters, &c., received	571
Letters sent	435

The examination questions used at the examination in February, 1907, are submitted as appendix No. 12.

Synopsis of the Work of the Board.

The meeting of July 19, 1906, was a special meeting called to pass the necessary resolution admitting J. D. McLennan as a Dominion land surveyor, his commission having been withheld until the completion of his term of apprenticeship.

Previous to the annual meeting in February sets of question papers for the various examinations were prepared by the members of the board. At this meeting the answers of three candidates at the limited preliminary examination, seventeen at the full preliminary examination, nineteen at the final D.L.S. examination, and one at the D.T.S. examination were examined.

Some discussion took place on the regulation made at the meeting in May, 1906, whereby candidates obtaining 75 per cent or more on any subject are not required to write on such subject if they present themselves again. It was felt that from such candidates a higher percentage should be required than from those coming up for the first time. No action in the matter was taken at this meeting.

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The question of who are eligible for examination under clause 111 of the Dominion Lands Act, having come up, it was decided that in future the secretary should accept articles for one year's service only, from graduates of colleges and universities who hold proper diplomas.

Considerable time was taken up in discussing the regulations governing the examination for certificate as Dominion topographical surveyor; and the schedule of studies was re-arranged. It was agreed that before the next meeting a brief statement should be prepared setting forth the work to be covered in each subject of this examination, and a list of the books to be used in preparing for it. The work was divided among the members of the board, Dr. Deville taking three subjects, and Dr. Klotz and Dr. King four subjects each.

A resolution was passed fixing the percentage of marks required to pass any examination at 50 per cent in each subject, and allowing candidates who obtain the required 50 per cent in certain subjects, but fail in other subjects, to take supplementary examinations.

A special meeting of the board was held on March 21, at which the curriculum of studies for the D.T.S. examination was further considered and a list of text books prepared.

A resolution was also passed allowing candidates whose term of service at the time of examination is within three weeks of completion to write on such examination, provided that field work is complete at the time of writing. Commissions in such cases will be withheld until the completion of the full term of apprenticeship of one year or three years, as the case may be.

APPENDICES.

The following schedules and statements are appended:—

No. 1. Schedule of surveyors employed and work executed by them from July 1, 1906, to March 31, 1907.

No. 2. Schedule showing for each surveyor employed from Jan. 1, 1906, to Mar. 31, 1907, the number of miles surveyed, of township section lines, township outlines, traverses of lakes and rivers, and resurvey; also cost of same.

No. 3. List of Dominion land surveyors who have been supplied with standard measures.

No. 4. List of lots in the Yukon Territory surveys of which have been confirmed from July 1, 1906, to March 31, 1907.

No. 5. List of miscellaneous surveys in the Yukon Territory returns of which have been received during the nine months ending March 31, 1907.

No. 6. Statement of work executed in the office of the chief draughtsman.

No. 7. List of sectional maps revised, printed, reprinted and revised and reprinted from July 1, 1906, to March 31, 1907.

No. 8. Statement of work executed in the survey records office for the nine months ending March 31, 1907.

No. 9. Statement of work executed in the photographic office during the nine months ending March 31, 1907.

No. 10. Statement of work executed in the lithographic office during the nine months ending March 31, 1907.

No. 11. Names and duties of employees of the Topographical Surveys Branch at Ottawa.

No. 12. Examination papers of the Board of Examiners for Dominion land surveyors.

No. 13 to 45. Reports of the surveyors employed.

No. 46. Descriptions of surveyed townships submitted by Dominion land surveyors during the nine months ending March 31, 1907.

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MAPS.

The following maps accompany this report:—

1. Diagram showing closings on base lines between the fifth and sixth meridians.
2. Mr. P. G. Stewart's exploration on the west side of the Canadian Northern railway from Etoimami to The Pas; to accompany his report.
3. Sketch map showing country near fourteenth base line, province of Saskatchewan, to accompany the report of J. N. Wallace, D.L.S.
4. Map to accompany J. W. McLaggan's report of exploration in Saskatchewan and the Northwest Territories.
5. Mr. A. D. Moodie's exploration from Etoimami to The Pas; to accompany his report.
6. Topographical survey of Canada—trigonometrical section. Triangulation in British Columbia. To accompany the report of P. A. Carson, D.L.S.

I have the honour to be, sir,

Your obedient servant,

E. DEVILLE,

Surveyor-General.

APPENDICES



TYPOGRAPHICAL SURVEYS BRANCH.

SCHEDULES AND STATEMENTS.

APPENDIX No. 1.

SCHEDULE of Surveyors employed and work executed by them from July 1, 1906 to March 31, 1907.

Surveyor.	Address.	Description of work.
Aylsworth, C. F....	Madoc, Ont.....	Re-survey of township 10 range 7, township 14 range 8, parts of townships 14 and 16 range 7, and parts of townships 15 ranges 7 and 8, all east of the principal meridian.
Baker, J. C.....	Vermilion, Alta.	Contract No. 14 of 1906; subdivision of township 59 range 20, township 58 range 21, and townships 61 ranges 25, 26 and 27, all west of the fourth meridian.
Beatty, David	Parry Sound, Ont.....	Correction survey in townships 51 ranges 27 and 24 west of the second meridian. Retracement surveys in the following townships west of the third meridian:—township 38 range 13, townships 45 ranges 9 and 10, townships 41, 42, 43 and 44 ranges 10 and 11, and townships 49 and 50 range 1. Retracement surveys in townships 50 ranges 26, 27 and 28 west of the second meridian.
Belanger, P. R. A.	Ottawa, Ont.....	Inspection of contracts No. 18 of 1905 and Nos. 11 and 12 of 1906. Restoration survey in the following townships west of the second meridian:—townships 24 ranges 1, 13, 14 and 15, townships 25 ranges 12, 14, 15 and 16, townships 26 ranges 12, 13 and 15, township 27 range 7, townships 28 ranges 6 and 13, townships 29 ranges 13, 14 and 15, township 30 range 13, townships 31 ranges 12 and 13 and townships 32 ranges 9, 10 and 11. Restoration survey in the following townships, west of the principal meridian:—township 5 range 34, townships 6 ranges 30, 32 and 34, townships 7 and 8 ranges 32 and 34, township 24 range 29, township 26 range 28 and townships 30 and 32 range 29.
Bolton, Lewis.....	Listowel, Ont.....	Contract No. 3 of 1906; subdivision of townships 3 and 4 ranges 13 and 14, east of the principal meridian.
Bourgeault, A.....	St. Jean Port Joli, Que.	Contract No. 11 of 1906; subdivision of townships 30 and 31 ranges 15 and 16, parts of township 30 range 14, and township 29 range 15, all west of the second meridian.
Bray, L. T.	Amherstburg, Ontario.	Re-survey in township 11 range 22, and subdivision in townships 1, 2, 3 and 4 range 30, west of the fourth meridian. Subdivision in townships 1 and 2 range 1, in township 5 range 2, in townships 6, 7, 8 and 9 range 3, in township 7 range 4, and in township 8 range 6, all west of the fifth meridian.
Carson, P. A.	Ottawa, Ont.....	Triangulation surveys in British Columbia, in connection with the Trigonometrical Section of the Topographical Survey of Canada.
Cantley, R. W.	Edmonton, Alta.....	Survey of the seventeenth base line across ranges 17 to 27 inclusive, west of the fourth meridian.
Cantley, R. H.	Edmonton, Alta.	Contract No. 16 of 1906; subdivision in townships 57, 58, 59 and 60 range 5, west of the fifth meridian.
Christie, Wm.	Chealey, Ont.....	Re-survey in township 17 range 1, in township 18 range 2, in townships 19 and 20 ranges 3, 4 and 5, and in township 20 range 6: re-survey of part of the outlines of township 16 range 1, of township 19 range 6, of township 18 range 3 and of township 17 range 2, all west of the principal meridian.

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APPENDIX No. 1.—Schedule of Surveyors employed and work executed by them from July 1, 1906, to March 31, 1907.—*Continued.*

Surveyor.	Address.	Description of work.
Deans, W. J.	Brandon, Man.	Subdivision in township 16 range 4, in townships 15, 16, 17 and 18 range 10, and in townships 14, 15, 16, 17 and 18 range 11 all west of the principal meridian. Re-survey of township 7 range 27, of townships 5, 6, 7 and 8 range 28 and of townships 5, 6, 7, 8 and 9 range 29, all west of the principal meridian. Re-survey of part of township 7 range 9, west of the second meridian. Miscellaneous surveys in township 17 range 21, west of the principal meridian.
Doupe, Jos.	Winnipeg, Man.	Re-survey in township 6, range 14 west of the second meridian.
Drummond, Thos.	Montreal, Que.	Contract No. 17 of 1906; subdivision of townships 57, 58, 59 and 60 range 6, west of the fifth meridian.
Dumais, P. T. C.	Hull, Que.	Contract No. 9 of 1906; subdivision of townships 26 ranges 12, 13 and 14, townships 23 and 26 range 10, and township 23 range 14, west of the principal meridian. Re-survey of townships 25 and 26 range 11, west of the principal meridian.
Edwards, Geo.	Ponoka, Alta.	Contract No. 13 of 1906; subdivision of townships 11 and 12 range 11; partial subdivision of townships 10 and 11 range 13, and townships 7, 8, 9, 10 and 11 range 1, west of the third meridian; survey of the east outline of townships 9 and 10 ranges 11 and 12 and of townships 5, 6, 7 and 8 range 2, west of the third meridian.
Fairchild, C. C.	Brantford, Ont.	Subdivision in townships 25, 26 and 27 range 11, in townships 25, 26, 27 and 28 range 12, and in township 24 range 8, all west of the fifth meridian. Miscellaneous work near Banff, Alta.
Fawcett, Thos.	Niagara Falls, Ont.	Contract No. 20 of 1906; subdivision of townships 56, 57, 58 and 59 range 4, west of the fifth meridian.
Fontaine, L. E.	Lévis, Que.	Re-survey of township 42 range 27, west of the third meridian. Miscellaneous surveys in townships 41 and 42 range 1, in township 43 range 3, in township 37 range 4, in township 47 range 5, in townships 43, 44 and 47 range 6, in township 40 range 8, in townships 41 and 42 range 9, in township 44 range 10, in township 38 range 14, and in townships 39 ranges 15 and 16, all west of the fourth meridian. Re-survey of township 50 range 3 west of the fifth meridian. Inspection of contracts Nos. 5 and 22 of 1906.
Grover, Geo. A.	Toronto, Ont.	Re-survey of township 18 range 1, east of the principal meridian. Re-survey of townships 19 and 20 ranges 1 and 2, and of townships 22 ranges 7 and 8, west of the principal meridian. Inspection of contracts Nos. 3, 4, 5, 6, 7, 8 and 10 of 1906.
Hawkins, A. H.	Listowel, Ont.	Subdivision of township 2 range 29 west of the third meridian. Re-surveys in townships 1 ranges 12 and 13, in township 2 range 13, in townships 6 and 7 range 17, in townships 10 and 11 range 22 and in township 13 range 29, all west of the fourth meridian. Re-survey of outlines of townships 1 and 2 range 8, of townships 1, 2, 3 and 4 range 9, of townships 1 ranges 10, 11 and 14, of township 2 range 14 and of township 10 range 24, all west of the fourth meridian. Survey of part of the south outline of township 3 range 29 west of the third meridian.
Holcroft, H. S.	Toronto, Ont.	Contract No. 10 of 1906; subdivision of township 7 range 9 and townships 6, 7, and 8 range 10, all east of the principal meridian. Subdivision of townships 7 and 8 ranges 27, 28, 29 and 30 west of the second meridian. Survey of the east outline of township 6 range 30, west of the second meridian.
Hopkins, M. W.	Edmonton, Alta.	Contract No. 23 of 1906; subdivision of townships 59 and 60 ranges 7, 8, 9 and 10, all west of the fourth meridian.
Hubbell, E. W.	Ottawa, Ont.	Re-survey in township 22 range 1, in townships 21 and 22 range 2, in townships 21, 22 and 23 range 3, in townships 21 and 22 range 4, in townships 21 and 22 range 5, in townships 21 ranges 6 and 7 and in townships 21 and 22 range 8, all west of the third meridian. Re-survey in township 27 range 24, in township 24 range 28, in townships 18 and 19 range 29, and in townships 26 and 29 range 25, all west of the second meridian. Inspection of contracts Nos. 13 and 25 of 1906.

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APPENDIX No. 1.—Schedule of Surveyors employed and work executed by them from July 1, 1906, to March 31, 1907.—*Continued.*

Surveyor.	Address	Description of Work.
Jephson, R. J.	Winnipeg, Man.	Miscellaneous surveys in townships 44 and 45 range 28 west of the principal meridian and in township 44 range 3 west of the second meridian.
Johnson, A. W.	Kamloops, B.C.	Subdivision in townships 1, 2, 3, 4 and 5 range 26, in township 1 range 27, in townships 2 and 3 range 24, in townships 2 and 4 range 25, in township 3 range 23, in townships 3 ranges 28 and 29, in township 4 range 28 and in township 15 range 27, all west of the sixth meridian. Subdivision in township 19 east of the coast meridian. Traverses in township 2 range 25, in townships 3 ranges 23, 24, 25 and 26, in townships 4 ranges 24, 25 and 26, in townships 5 ranges 25 and 26, in township 15 range 27, and in township 3 range 28, all west of the sixth meridian. Traverses in townships 19 and 20 east of the coast meridian.
Kirk, J. A.	Revelstoke, B.C.	Double traverse of Blaeberry creek valley from the mouth to the northern limit of the railway belt, and part subdivision of township 28 range 22 west of the fifth meridian.
Knight, R. H.	Edmonton, Alta.	Contract No. 21 of 1906; subdivision of townships 50 and 51 ranges 5 and 6, and townships 54 and 55 range 7, all west of the fifth meridian.
Loneragan, G. J.	Buckingham, Que.	Re-surveys in townships 51 ranges 2 and 3 west of the fifth meridian and in townships 56 ranges 22 and 24 west of the fourth meridian. Correction surveys in townships 58 and 59 range 22 west of the fourth meridian. Miscellaneous surveys in township 59 range 23, in townships 59 ranges 17 and 18, in township 52 range 12, in township 60 range 14 and in township 55 range 4, all west of the fourth meridian; and in township 53 range 28 west of the third meridian. Subdivision in township 51 range 20 west of the fourth meridian. Correction survey at Fort Saskatchewan. Survey of outlines of township 56 range 25, of township 49 range 1, of township 57 range 14, all west of the fourth meridian. Survey of outlines of townships 53 and 54 ranges 27 and 28 west of the third meridian. Inspection of contract No. 23 of 1906.
Laurie, R. C.	Battleford, Sask.	Re-survey of the townsite of South Battleford.
Macdonell, J. A.	Winnipeg, Man.	Exploration survey of three and a half million acres, grant to the Dominion Government "in that portion of the Peace river district of British Columbia lying east of the Rocky mountains and adjoining the province of Alberta."
MacLennan, A. L.	Toronto, Ont.	Subdivision in townships 11 and 12 range 3, and in townships 10 and 11 range 4, and survey of the east outline of township 12 range 4, all west of the fifth meridian.
McFarlane, W. G.	Toronto, Ont.	Contract No. 5 of 1906; subdivision of townships 34 and 35 range 22, townships 28 and 32 range 23, townships 24 and 35 range 25, and township 35 range 26, all west of the principal meridian. Subdivision of townships 7 and 8 ranges 14, 15 and 16, townships 6 ranges 13, 14, 15 and 16, township 7 range 13, and townships 3 ranges 12 and 13, all west of the fourth meridian.
McFee, A.	Innisfail, Alta.	Contract No. 22 of 1906; subdivision of township 28 range 18, and townships 35 ranges 14, 15 and 16, all west of the fourth meridian. Traverse in township 35 range 2 west of the fifth meridian.
McGrandle, Hugh.	Wetaskiwin, Alta.	Contract No. 18 of 1906; subdivision of townships 58 and 59 range 7; surveys of outlines in townships 57, 59 and 60 range 7, and in township 58 range 5; traverse in township 60 range 7, all west of the fifth meridian.
McLaggan, J. W.	Strathcona, Alta.	Exploratory survey in the province of Saskatchewan and in Keewatin territory northeasterly from The Pas.
McMillan, Geo.	Ottawa, Ont.	Inspection of contracts Nos. 12, 15, 17, 19 and 20 of 1903 and contracts Nos. 1, 14, 15, 16 and 21 of 1906. Traverses in townships 59 and 60 range 11, west of the fourth meridian.
Michaud, A.	Edmonton, Alta. (Since deceased)	Contract No. 19 of 1906; subdivision of townships 54, 55 and 56 range 5, west of the fifth meridian.

7-8 EDWARD VII., A. 1908

APPENDIX No. 1.—Schedule of Surveyors employed and work executed by them from July 1, 1906, to March 31, 1907.—*Continued.*

Surveyor.	Address.	Description of work.
Miles, C. F.	Toronto, Ont.	Subdivision in township 15 range 1, in townships 13, 14 and 15 range 2, in townships 17, 18, 19 and 20 range 3 and in townships 21 and 22 range 4, west of the fifth meridian. Survey of outlines of townships 12 ranges 3 and 4, west of the fifth meridian. Traverse in township 21 range 27, west of the fourth meridian.
Molloy, John.	Winnipeg, Man.	Contracts Nos. 2 and 7 of 1906; subdivision of townships 1 and 2 range 10, townships 1, 2 and 6 range 11, townships 2, 3 and 6 range 12, townships 1, 5 and 6 range 13, townships 5, 6 and 7 range 14 and township 6 range 9; traverse in townships 13 and 14 ranges 12 and 13, all east of the principal meridian.
Montgomery, R. H. .	Prince Albert, Sask. .	Contract No. 12 of 1906; subdivision of townships 50 ranges 22, 23, 24, 25 and 26 and townships 51 ranges 22, 23 and 26 and survey of the east outline of townships 52 ranges 22, 23 and 24, all west of the second meridian. Subdivision of townships 50 ranges 2 and 3, and townships 51 ranges 1 and 2, all west of the third meridian.
Moodie, A. D.	Lakefield, Ont.	Exploration survey of the country between Erwood, Saskatchewan and The Pas, Keewatin along the right of way of the Canadian Northern railway.
O'Hara, W. F.	Ottawa, Ont.	Re-surveys in townships 32, 33 and 34 ranges 21 and 22, and in township 35 range 21 west of the fourth meridian. Miscellaneous surveys in township 38 range 28 west of the fourth meridian, and in township 38 range 1, west of the fifth meridian. Subdivision in township 5 range 3, west of the fifth meridian.
Parsons, J. L. R.	Winnipeg, Man. . . .	Contracts No. 6 of 1906 and No. 3 of 1907; subdivision of townships 9 ranges 10 and 11, township 10 range 9 and townships 15 and 16 ranges 14 and 15, all east of the principal meridian; subdivision of townships 23 and 24 ranges 4, 6 and 7; subdivision in township 29 range 10, and survey of part of the outlines of township 28 range 10, all west of the principal meridian.
Reilly, W. R.	Regina, Sask.	Re-surveys in townships 33 and 34 ranges 1 and 2, in townships 38 ranges 1, 2 and 3, in township 37 range 1 and in township 36 range 6, all west of the third meridian. Re-surveys in townships 41 and 42 range 28, west of the second meridian. Partial re-surveys in township 34 range 6, west of the third meridian and in townships 41 and 42 range 28 west of the second meridian.
Richard, J. F.	Sta. Anne de la Pocatière, Que.	Settlement surveys at The Pas, Cumberland House and Big Eddy.
Rinfret, R.	Montreal, Que.	Contract No. 24 of 1906; subdivision of townships 65, 66, 67 and 68 range 13, townships 65, 66, 67 and 68 range 14, and townships 66 and 68 range 15; survey of the east outline of township 66 range 16, all west of the fourth meridian.
Ross, Jos. E.	Kamloops, B. C.	Subdivision surveys in townships 22 ranges 26 and 27, west of the fifth meridian; also in townships 23 ranges 2 and 3, in townships 22 and 23 range 16, in townships 18 and 22 range 17, in townships 17 ranges 17, 18 and 19, in township 16 range 18, and in townships 19 ranges 16, 17 and 18, all west of the sixth meridian. Traverses in townships 19 ranges 16, 17 and 18, in townships 17 and 19 range 17, in township 17 range 18, in townships 22 and 23 range 2, and in townships 21 and 22 range 1, all west of the sixth meridian; also in township 21 range 29 west of the fifth meridian. Surveys on the shores of Shuswap and Mara lakes. Traverse of Columbia river from Beaver mouth to the north limit of the railway belt. Traverse of Incomappleux river and Boyd creek trail. Traverse of Huff lake and part of North Thompson river.
Roy, Geo. P.	Quebec, Que.	Contract No. 15 of 1906; subdivision of townships 58 and 59 range 27, west of the fourth meridian, and townships 60 ranges 3 and 4, west of the fifth meridian.

SESSIONAL PAPER No. 25b

APPENDIX No. 1.—Schedule of Surveyors employed and work executed by them from July 1, 1906 to March 31, 1907.—*Concluded.*

Surveyor.	Address.	Description of work.
Saint Cyr, A....	Ottawa, Ont.....	Survey of the seventeenth base line across ranges 19 to 22 inclusive west of the fifth meridian, the eighteenth base line across ranges 1 to 8 inclusive west of the sixth meridian, the twenty-first base line across ranges 21 to 24 inclusive, the twenty-second base line across ranges 21 to 26 inclusive, and the eighteenth base line across ranges 20 to 22 inclusive, west of the fifth meridian.
Saint Cyr, J. B.	Sta. Anne de la Perade, Que.....	Surveys of the Fort Vermilion, North Vermilion and Boyer settlements, in the Peace river district. Re-surveys in townships 6 ranges 25, 26 and 27 west of the principal meridian.
Saunders, B. J.....	Edmonton, Alta	Survey of the fourth base line across ranges 13, 14 and part of 15 and the fifth base line across ranges 13 to 17 inclusive, east of the principal meridian.
Selby, H. W.	Toronto, Ont.	Subdivision in township 76 range 15, in townships 74, 75 and 76 range 16 and in townships 73, 74 and 75 range 17, west of the fifth meridian. Survey of part of the outlines of townships 73 ranges 16 and 18 and of township 75 range 15 west of the fifth meridian. Traverse of the southerly boundaries of lots in Heart River and Big Prairie Settlements, Alta.
Stewart, P. G	Britannia Bay, Ont....	Exploration survey of the country between Erwood, Saskatchewan and The Pas, Keewatin along the Canadian Northern railway right of way.
Teasdale, C. M.....	Concord, Ont.....	Contract No. 25 of 1906; subdivision of townships 9, 10 and 11 ranges 28, 29 and 30 west of the second meridian. Partial subdivision of township 10 range 4, west of the third meridian.
Thibaudeau, W.	Ottawa, Ont.....	Exploration survey of the country lying between Fort Churchill on Hudson bay and The Pas on Saskatchewan river.
Tyrrell, J. W.....	Hamilton, Ont.....	Contracts Nos. 4 and 27 of 1906; subdivision of townships 7 ranges 11, 12 and 13, township 8 range 11, and townships 16 and 17 ranges 9 and 10, all east of the principal meridian. Survey of the east outline of townships 16 and 17 range 8 and of the north outline of township 15 range 9, all east of the principal meridian.
Wallace, J. N	Calgary, Alta.	Survey of the fourteenth base line between the third and second meridians, and of the second meridian as far north as Saskatchewan river. Survey of lines to connect with "Red Earth" and "Shoal Lake" Indian reserves.
Warren, Jas	Walkerton, Ont.....	Re-surveys in townships 21 and 22 ranges 27 and 28, west of the third meridian. Retracement surveys in townships 11 and 12 ranges 25 and 26, in townships 14 ranges 19 and 30, in township 16 range 15 and in township 19 range 24, all west of the second meridian.
Watt, Geo. H.....	Ottawa, Ont.....	Contract No. 8 of 1906; subdivision of townships 14 and 15 range 10, and township 14 range 9; partial subdivision of township 15 range 3, all east of the principal meridian.
Wheeler, A. O	Calgary, Alta.....	Topographer of the Department of the Interior. Phototopographical surveys from Mts. Douglas and Drummond near Red Deer river, to the Beaverfoot range.

7-8 EDWARD VII., A. 1906

APPENDIX No. 2.

SCHEDULE showing for each surveyor employed from January 1, 1906, to March 31, 1907, the number of miles surveyed, of township section lines, township outlines, traverses of lakes and rivers and re-survey; also the cost of same.

Surveyor.	Miles of Section Lines.	Miles of Outlines.	Miles of Traverse.	Miles of Re-survey.	Total Mileage.	Total Cost.	Cost per Mile.	By Day Work or by Contract.
						\$ cts.	\$ cts.	
Aylsworth, C. F.				239	239	7,143 00	29 88	Day.
Baker, J. C.	234	18	56		308	8,270 27	26 85	Contract.
Beatty, David.				484	484	6,700 00	13 84	Day.
(b) Belanger, P. R. A.				48	48	5,847 72		"
Bolton, Lewis.	199		26		225	6,334 00	28 15	Contract.
Bourgeault, A.	198	11	36	30	275	7,133 00	25 94	"
Bray, L. T.	87	12		70	169	6,052 61	35 81	Day.
Cautley, R. W.		120			120	7,528 91	62 74	"
Cautley, R. H.	192	25	58		275	7,284 00	26 49	Contract.
Christie, Wm.			142	339	481	6,825 81	14 19	Day.
Deans, W. J.	201	32	20	651	904	7,023 88	7 77	"
Doupe, Jos.	4				4			"
Drummond, T.	194	24	67		285	7,586 00	26 62	Contract.
Driscoll, A.	33	24	14		71	2,243 85	31 60	"
Dumais, P. T. C.	66	6			72	2,533 00	35 18	"
Edwards, Geo.	535	49			584	4,434 00	7 59	"
Fairchild, C. C.	68	12	27	3	110	5,905 48	53 69	Day.
Fawcett, T.	185	12	61		258	6,956 00	26 96	Contract.
(b) Fontaine, L. E.			10	73	83	8,189 09		Day.
(b) Grover, Geo. A.			7	179	186	7,019 61		"
Hawkins, A. H.		18	3	305	326	5,903 66	18 11	"
Holcroft, H. S.	575	42			617	10,506 00	17 03	Contract.
Hopkins, M. W.	383	12	152		547	11,875 56	21 71	"
(b) Hubbell, E. W.				703	703	9,048 26		Day.
Jephson, R. J.	16		13		29	579 00	19 97	Contract.
Johnson, A. W.	61		60	17	138	12,242 97	88 72	Day.
Kirk, J. A.	3		49		52	629 00	12 10	Contract.
Knight, R. H.	165	2	62		229	6,462 00	28 22	"
(b) Lonergan, G. J.	27	2	13	219	261	8,409 13		Day.
MacLennan, A. L.	14	6	11		31	2,816 00	90 84	"
MacLennan, A. L.	29	5	20		54	1,296 00	24 00	Contract.
McFarlane, W. G.	837	6			843	10,839 00	12 86	"
McFee, A.	153	1	61		215	1,806 00	8 40	"
McGrandle, H.	79	36	6		121	3,325 00	27 48	"
(a) McMillan, Geo.			4		4	7,037 06		Day.
Michaud, A.	235	8	43		286	8,184 00	28 62	Contract.
Miles, C. F.	212	19	1		232	8,020 57	34 58	Day.
Molloy, John.	838	60	51	12	961	27,957 00	29 09	Contract.
Montgomery, R. H.	507	60	23	1	591	17,297 00	29 27	"
O'Hara, W. F.	12			217	229	7,631 88	33 33	Day.
Parsons, J. L. R.	697	24	104	54	879	23,458 00	26 67	Contract.
Ponton, A. W.		110			110	7,385 35	67 14	Day.
Reilly, W. R.			92	710	802	7,560 30	9 43	"
Richard, J. F.			25		25	2,000 00	80 00	"
Rinfret, R.	294	63	159		516	10,320 00	20 00	Contract.
Ross, J. E.	103	16	104	28	251	7,705 79	30 70	Day.
Roy, G. P.	294	28	75		397	9,424 00	23 74	Contract.
Saint Cyr, A.		146			146	16,434 00	112 56	Day.
Saint Cyr, J. B.			106	50	156	3,951 50	25 33	"
Saunders, B. J.		46			46	9,034 00	196 39	"
Selby, H. W.	246	84	7		337	10,867 00	32 25	"
Teasdale, C. M.	394		59		453	3,603 00	7 95	Contract.
Tyrrell, J. W.	502	30	8	24	564	17,162 00	30 43	"
Wallace, J. N.		133	6	13	152	16,764 69	110 29	Day.
Warren, Jas.			5	467	472	3,850 65	8 16	"
Watt, G. H.	90	4	2	12	108	3,222 72	29 84	Contract.
Total	9,862	1,306	1,848	4,948	17,064	435,618 32	24 72	

(a) Inspector of contract surveys.

(b) Inspecting contract surveys a portion of the season.

Total cost..... \$435,618 32

" Mileage..... 17,064 00

Cost per mile..... \$ 24 72

SESSIONAL PAPER No. 25b

APPENDIX No. 3.

List of Dominion Land Surveyors who have been supplied with Standard Measures.

Name.	Address.	Date of Appointment.	Remarks.
Austin, G. F.	Dewdney, Alta.	April 14, '72.	
Aylen, J.	Aylmer, Que.	May 29, '85.	
Aylsworth, C. F.	Madoc, Ont.	" 17, '86.	
Baker, J. C.	Vermilion, Alta.	" 18, '06.	
Barwell, C. S. W.	Dawson, Yukon Territory.	Aug. 21, '94.	
Bayne, G. A.	Winnipeg, Man.	April 14, '72.	
Beatty, D.	Parry Sound, Ont.	" 14, '72.	
Beatty, W.	Delta, Ont.	" 14, '72.	
Belanger, P. R. A.	Ottawa, Ont.	May 17, '80.	Topog. Surveys Branch Dept. o Interior.
Belleau, J. A.	"	" 15, '83.	Topog. Surveys Branch Dept. of Interior.
Bigger, C. A.	"	Mar. 30, '82.	Astronomer, Dept. of Interior.
Bolton, L.	Listowel, Ont.	April 14, '72.	
Boswell, E. J.	Winnipeg, Man.	Feb. 18, '03.	
Bourgesault, A.	St. Jean Port Joli, Que.	Mar. 29, '83.	
Bourganlt, C. E.	" "	Feb. 21, '88.	
Bourget, C. A.	Levis, Que.	May 14, '84.	
Bowman, H. J.	Berlin, Ont.	Feb. 16, '88.	
Brabazon, A. J.	Ottawa, Ont.	May 12, '82.	
Brady, J.	Golden, B.C.	April 14, '72.	
Bray, S.	Ottawa, Ont.	Nov. 14, '83.	Dept. of Indian Affairs.
Bray, E.	Oakville, Ont.	April 14, '72.	
Bray, L. T.	Amherstburg, Ont.	Feb. 18, '03.	
Bridgland, M. P.	Calgary, Alta.	Mar. 10, '06.	Topog. Surveys Branch Dept. of Interior.
Brodie, S.	Fort Qu'Appelle, Sask.	April 14, '72.	
Brownlee, J. H.	Victoria, B. C.	" 15, '87.	
Burke, W.	Minnedosa, Man.	" 14, '72.	
Burnet, H.	Victoria, B.C.	June 22, '85.	
Burwash, N. A.	Whitehorse, Yukon Territory.	Mar. 6, '07.	
Burwell, H. M.	Vancouver, B.C.	Feb. 17, '87.	
Carbert, J. A.	Medicine Hat, Alta.	May 12, '80.	
Carpenter, H. S.	Regina, Sask.	Feb. 20, '01.	Dept. of Public Works for Sas- katchewan.
Carroll, C.	Prince Albert, Sask.	April 14, '72.	
Carson, P. A.	Ottawa, Ont.	Feb. 22, '06.	Topog. Surveys Branch Dept. of Interior.
Cantley, R. H.	Edmonton, Alta.	May 1, '05.	
Cantley, R. W.	"	Sept. 2, '96.	
Cavana, A. G.	Orillia, Ont.	Nov. 16, '76.	
Charlesworth, L. C.	Edmonton, Alta.	Feb. 27, '03.	Dept. of Public Works for Alberta.
Christie, W.	Chealey, Ont.	Mar. 22, '06.	
Cleveland, E. A.	Vancouver, B.C.	June 27, '99.	
Côté, J. A.	Quebec, Que.	May 14, '84.	
Côté, J. L.	Edmonton, Alta.	Mar. 21, '90.	
Cotton, A. F.	New Westminster, B.C.	May 11, '80.	
Craig, J. D.	Ottawa, Ont.	Feb. 24, '02.	Boundary Surveys, Dept. of Int.
Cummings, J. G.	Calgary, Alta.	" 17, '04.	
Dalton, J. J.	Weston, Ont.	April 17, '79.	Dominion Topographical Surveyor.
Deans, W. J.	Brandon, Man.	May 13, '86.	
Dennis, J. S.	Calgary, Alta.	Nov. 19, '77.	Dominion Topographical Surveyor, Inspector of Irrigation and British Columbia Land Com- missioner, C.P.R.
Denny, H. C.	"	April 1, '82.	
Dickson, H. G.	Whitehorse, Yukon Territory.	May 19, '89.	
Dickson, J.	Fenelon Falls, Ont.	April 14, '72.	
Dobie, J. S.	Regina, Sask.	Mar. 22, '06.	Dept. of Public Works for Sas katchewan.

7-8 EDWARD VII., A. 1908

APPENDIX No. 3—List of Dominion Land Surveyors who have been supplied with Standard Measures.—*Continued.*

Name.	Address.	Date of Appointment.	Remarks.
Doupe, J.	Winnipeg, Man.	April 14, '72..	Asst. Land Commissioner C.P.R.
Doupe, J. L.	"	Oct. 6, '88..	
Drewry, W. S.	New Denver, B.C.	Nov. 14, '83..	Dominion Topographical Surveyor. Swamp Land Commissioner.
Driscoll, A.	Edmonton, Alta.	Feb. 23, '87..	
Drummond, T.	Montreal, Que.	June 24, '78..	
Ducker, W. A.	Winnipeg, Man.	Mar. 30, '83..	
Dumais, P. T. C.	Hull, Que.	" 29, '82..	Dominion Topographical Surveyor.
Edwards, Geo.	Ponoka, Alta.	April 14, '72..	
Ellacott, C. H.	Regina, Sask.	Feb. 22, '99..	
Fairchild, C. C.	Brantford, Ont.	" 20, '01..	
Farncomb, A. E.	Red Deer, Alta.	Mar. 12, '02..	
Fawcett, T.	Niagara Falls, Ont.	Nov. 18, '76..	
Fawcett, A.	Gravenhurst, Ont.	Feb. 22, '83..	
Fontaine, L. E.	Levis, Que.	Aug. 13, '92..	
Foster, F. L.	Toronto, Ont.	April 14, '72..	
Francis, J.	Poplar Point, Man.	June 17, '75..	
Garden, J. F.	Vancouver, B. C.	May 13, '80..	City Surveyor, Winnipeg.
Garden, G. H.	Lethbridge, Alta.	April 14, '72..	
Garden, C.	Winnipeg, Man.	" 14, '72..	
Gauvreau, L. P.	Riviere du Loup, Que.	" 14, '72..	
Gibbon, J.	Dawson, Yukon Territory	Feb. 12, '91..	
Gordon, M. L.	Toronto, Ont.	" 18, '04..	
Gordon, R. J.	Stirling, Alta.	Mar. 12, '02..	
Gore, T. S.	Victoria, B.C.	April 19, '79..	
Green, T. D.	Dawson, Yukon Territory	May 19, '84..	
Grover, G. A.	Toronto, Ont.	Feb. 13, '04..	
Harris, J. W.	Winnipeg, Man.	April 14, '72..	Topographical Surv. Br., Dep. of Int. President of the D. L. S. Association.
Harvey, C.	Indian Head, Sask.	Feb. 17, '04..	
Hawkins, A. H.	Listowel, Ont.	Mar. 6, '06..	
Henderson, W.	Chilliwack, B.C.	Nov. 17, '83..	
Holcroft, H. S.	Toronto, Ont.	Feb. 18, '03..	
Hopkins, M. W.	Edmonton, Alta.	" 20, '01..	
Hubbell, E. W.	Ottawa, Ont.	May 19, '84..	
Irwin, J. M.	Kenora, Ont.	April 14, '72..	
James, S.	Toronto, Ont.	" 14, '72..	
Jephson, R. J.	Winnipeg, Man.	May 12, '80..	Dominion Topographical Surveyor, Chief Astronomer, Dept of In- terior.
Johnson, A. W.	Kamloops, B.C.	Mar. 12, '02..	
King, W. F.	Ottawa, Ont.	Nov. 21, '76..	
Kirk, J. A.	Revelstoke, B.C.	May 11, '80..	
Klotz, O. J.	Ottawa, Ont.	Nov. 19, '77..	Dominion Topographical Surveyor, Astronomer, Dept. of the Inter- ior.
Knight, R. H.	Edmonton, Alta.	Feb. 18, '04..	
Latimer, F. H.	Detroit, Mich.	" 13, '85..	
Laurie, R. C.	Battleford, Sask.	April 27, '83..	
Lawe, H.	Ottawa, Ont.	" 14, '72..	
Lemoine, C. E.	Quebec, Que.	Mar. 31, '82..	
Lendrum, R. W.	Strathcona, Alta.	May 15, '80..	
Loneragan, G. J.	Buckingham, Que.	Feb. 28, '01..	
Lumsden, H. D.	Ottawa, Ont.	April 14, '72..	
Macpherson, C. W.	Dawson, Yukon Territory	Mar. 7, '00..	Chief Engineer Transcontinental Railway. Director of Surveys Y. T.
Magrath, C. A.	Lethbridge, Alta.	Nov. 16, '81..	
Malcolm, L.	Blenheim, Ont.	April 14, '72..	Dominion Topographical Surveyor, Land Commissioner, Alberta Railway and Coal Co. District Surveyor and Town En- gineer.
Meadows, W. W.	Maple Creek, Sask.	Feb. 23, '05..	
Miles, C. F.	Toronto, Ont.	April 14, '72..	
Moberly, H. K.	Innisfail, Alta.	Feb. 27, '03..	
Molloy, J.	Winnipeg, Man.	April 14, '72..	
Montgomery, R. H.	Prince Albert, Sask.	Feb. 23, '05..	
Moore, H. H.	Calgary, Alta.	" 17, '04..	
McArthur, J. J.	Ottawa, Ont.	" 17, '79..	

SESSIONAL PAPER No. 25b

APPENDIX No. 3.—List of Dominion Land Surveyors who have been supplied with Standard Measures.—*Continued.*

Name.	Address.	Date of Appointment.	Remarks.
McColl, G. B.	Winnipeg, Man.	Mar. 20, '07.	
McFadden, M.	Neepawa, Man.	Feb. 14, '72..	
McFarlane, W. G.	Toronto, Ont.	May 19, '06..	
McFee, A.	Innisfail, Alta.	Feb. 19, '79..	
McGrandle, H.	Wetaskiwin, Alta.	May 30, '73..	
McKenna, J. J.	Dublin, Ont.	April 14, '72..	
McKenzie, J.	New Westminster, B.C.	Nov. 18, '88..	Dominion Lands Agent, New Westminster.
McLatchie, J.	Nelson, B.C.	April 14, '72..	
McLean, J. K.	Ottawa, Ont.	" 1, '82..	Dept. of Indian Affairs.
MacLennan, A. L.	Toronto, Ont.	Feb. 23, '05..	
McMillan, G.	Ottawa, Ont.	" 22, '06..	Inspector of Surveys, Dept. of Interior.
McPherson, A. J.	Dawson, Yukon Ter.	" 21, '01..	
McPhillips, G.	Windsor, Ont.	June 17, '75..	
McVittie, A. W.	Blairmore, Alta.	Mar. 30, '82..	
Nash, T. S.	Ottawa, Ont.	Feb. 18, '04..	Topographical Surveys Branch, Dept. of Interior.
Ogilvie, W.	"	April 14, '72..	
O'Hara, W. F.	"	Feb. 19, '95..	
Ord, L. R.	Winnipeg, Man.	April 1, '82..	
Parsons, J. L. R.	"	Feb. 23, '05..	
Patrick, A. P.	Calgary, Alta.	Nov. 19, '77..	Dominion Topographical Surveyor.
Pearce, W.	"	May 10, '80..	
Phillips, E. H.	Ottawa, Ont.	Feb. 24, '02..	Topographical Surveys Branch, Dept. of Int.; Sec. Treas. D.L.S. Association.
Ponton, A. W.	Macleod, Alta.	May 18, '81..	
Proudfoot, H. B.	Saskatoon, Sask.	Mar. 28, '82..	
Rainboth, E. J.	Ottawa, Ont.	May 19, '81..	
Rainboth, G. C.	Aylmer, Que.	April 14, '72..	Boundary Surveys, Dept. of Int.
Reid, J. L.	Ottawa, Ont.	" 14, '72..	Dept. of Indian Affairs.
Reilly, W. R.	Regina, Sask.	Nov. 17, '81..	
Richard, J. F.	Ste. Aune de la Posatière, Que.	May 13, '82..	
Rinfret, R.	Montreal, Que.	Feb. 20, '00..	
Ritchie, J. F.	Nelson, B.C.	Jan. 7, '89..	
Robertson, H. H.	Montmagny, Que.	April 14, '72..	
Roberts, S. A.	Victoria, B.C.	May 16, '85..	
Roberts, V. M.	Sturgeon Falls, Ont.	" 17, '86..	
Robinson, F. J.	Regina, Sask.	Feb. 22, '00..	Dept. of Public Works for Saskatchewan.
Rombough, M. B.	Morden, Man.	April 14, '72..	
Rorke, L. V.	Toronto, Ont.	Aug. 13, '91..	
Ross, G.	Welland, Ont.	Nov. 21, '82..	
Rosa, J. E.	Kamloops, B.C.	Feb. 12, '01..	
Roy, G. P.	Quebec, Que.	Nov. 17, '81..	
Saint Cyr, J. B.	Ste. Anne de la Pérade, Que.	Feb. 17, '87..	
Saint Cyr, A.	Ottawa, Ont.	" 17, '87..	
Saunders, B. J.	Edmonton, Alta.	Nov. 16, '84..	
Seager, E.	Kenora, Ont.	April 14, '72..	
Selby, H. W.	Toronto, Ont.	Nov. 15, '82..	
Sewell, H. de Q.	"	May 16, '85..	
Shaw, C. A. E.	Victoria, B.C.	" 10, '80..	
Smith, C. C.	West Selkirk, Man.	Feb. 22, '06..	
Speight, Thos.	Toronto, Ont.	Nov. 16, '82..	
Starkey, S. M.	Starkey's P.O., N.S.	April 14, '72..	
Stewart, G. A.	Calgary, Alta.	" 14, '72..	
Stewart, L. B.	Toronto, Ont.	Nov. 22, '82..	Dominion Topographical Surveyor; Professor of Surveying, School of Practical Science.
Stewart, E.	Ottawa, Ont.	April 14, '72..	
Talbot, A. C.	Calgary, Alta.	May 13, '80..	
Tenasdale, C. M.	Concord, Ont.	Mar. 9, '06..	
Thompson, W. T.	Fort Qu'Appelle, Sask.	Nov. 19, '77..	Dominion Topographical Surveyor.
Tracy, T. H.	Vancouver, B.C.	April 14, '72..	City Engineer, Vancouver.
Tremblay, A. J.	Les Eboulements, Que.	Feb. 18, '96..	
Towle, C. F.	Magog, Que.	April 14, '72..	
Turnbull, T.	Winnipeg, Man.	Mar. 29, '82..	

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APPENDIX No. 3.—List of Dominion Land Surveyors who have been supplied with Standard Measures.—*Concluded.*

Name.	Address.	Date of Appointment.	Remarks.
Tyrrell, J. W.....	Hamilton, Ont.....	Feb. 16, '87..	Dept. of Public Works for Saskatchewan.
Vaughan, J. W.....	Vancouver, B.C.....	June 11, '78..	
Vicars, J.....	Kamloops, B.C.....	May 17, '86..	
Walker, E. W.....	Regina, Sask.....	Mar. 27, '07..	
Wallace, J. N.....	Calgary, Alta.....	Feb. 20, '00..	Topographer of the Dept. of Int. Dominion Topographical Surveyor.
Warren, J.....	Walkerton, Ont.....	April 14, '72..	
Watt, G. H.....	Ottawa, Ont.....	Feb. 24, '02..	
Weekes, A. S.....	Clinton, Ont.....	" 11, '92..	
Weekes, M. B.....	Ottawa, Ont.....	" 18, '03..	
Wheeler, A. O.....	Calgary, Alta.....	Nov. 21, '82..	
White-Fraser, G. W.R.	Ottawa, Ont.....	Feb. 21, '88..	
Wiggins, T. H.....	Regina, Sask.....	" 18, '96..	
Wilkins, F. W.....	Norwood, Ont.....	May 18, '81..	
Wilkinson, W. D.....	Toronto, Ont.....	Feb. 22, '93..	
Woods, J. E.....	Frank, Alta.....	Nov. 14, '85..	Dominion Topographical Surveyor.
Young, W. B.....	Winnipeg, Man.....	Mar. 25, '05..	

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APPENDIX No. 4.

List of lots in the Yukon Territory surveys of which have been confirmed from July 1st, 1906, to March 31st, 1907.

Lot No.	Area in Acres.	Surveyor.	Year of Survey.	Date of Approval.	Claimant.
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GROUP No. 1.

35	160.00	C. S. W. Barwell...	1906	Nov. 24, 1906..	Messrs. Simer, McRae, Boggs & Carlsen
36	80.00	"	1906	" 24, 1906..	" " " "
37	159.00	"	1906	" 24, 1906..	" " " "
38	20.00	"	1906	" 24, 1906..	" " " "
39	20.00	"	1906	" 24, 1906..	" " " "

GROUP No. 2.

265	15.80	T. D. Green.....	1906	Nov. 12, 1906..	The Klondike Mines R. R. Co.
279	28.01	"	1906	July 5, 1906..	Dawson City Quartz Mining Co. Ltd.
280	45.40	"	1906	" 9, 1906..	" " " "
296	51.52	"	1906	Oct. 19, 1906..	Peter Anderson.
297	51.65	"	1906	" 19, 1906..	" " " "
343	47.33	"	1906	" 30, 1906..	Mrs. M. J. Mitchell.
344	57.65	"	1906	" 30, 1906..	" " " "
365	51.65	"	1906-06	" 19, 1906..	Mrs. L. D. Schmidt.

APPENDIX No. 5.

List of miscellaneous surveys in the Yukon Territory returns of which have been received during the nine months ending March 31st, 1907.

Year.	Surveyor.	Description of Survey.
1906	H. G. Dickson.....	Reference traverse from the B. C. Boundary at Windy Arm to Carcross, at Caribou Crossing.

APPENDIX No. 6.

STATEMENT of work executed in the office of the chief draughtsman.

Returns of surveys examined:—

Township subdivision..	354
Township outline..	122
Mineral claims..	17
Correction and other miscellaneous surveys..	256
Township plans completed for printing..	451
Preliminary township plans prepared..	179
Proofs of plans examined..	541
Sketches made..	946
Tracings and miscellaneous plans made..	718
Applications for various information dealt with..	1,026
Instructions to surveyors..	86
Files received and returned..	940
Progress sketches received and filed..	630
Field books received from surveyors..	365
Plans received from surveyors..	169
Plans of Yukon lots received..	13
Plans of miscellaneous Yukon surveys received..	1
Sectional maps revised but not reprinted..	5

Sectional maps revised and reprinted:—

3 miles to 1 inch..	22
6 miles to 1 inch..	24

Sectional maps printed:—

3 miles to 1 inch..	2
6 miles to 1 inch..	3
Sectional maps reprinted 3 miles to 1 inch..	6
Declarations of settlers received and filed..	382
Reference traverses drawn on group plans of Yukon Territory..	1
Mineral claims reduced to 40 chains to an inch and plotted on group plans of Yukon Territory..	2
Books sent to record office to be placed on record..	649
Plans, other than township plans, sent to record office to be placed on record..	81
Books received from record office and used in connection with office work..	3,446
Books returned to record office..	3,586
Volumes of plans received from record office and used in connection with office work..	38
Volumes of plans returned to record office..	54
Plans received from record office and used in connection with office work..	372
Plans returned to record office..	303

APPENDIX No. 7.

LIST of sectional maps revised, printed, reprinted, and revised and reprinted from July 1, 1906, to March 31, 1907.

1. Sectional maps revised but not reprinted:—

Port Moody.	Rosebud.
Cypress.	Duck Mountain.
Fairford.	

2. Sectional maps compiled and printed.

(a) On a scale of 6 miles to 1 inch:—

Lake of the Woods.

(b) On scales of 3 miles and 6 miles to 1 inch:—

Cross Lake.	Mossy Portage.
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3. Sectional maps reprinted on a scale of 3 miles to 1 inch:—

Macleod.	Rocky Mountain House.
Blackfoot.	Humboldt.
Rush Lake.	Pasquia.

4. Sectional maps revised and reprinted.

(a) On a scale of 3 miles to 1 inch:—

Wood Mountain.	Portage la Prairie.
Willow Bunch.	Red Deer Forks.
Souris.	Regina.
Dufferin.	Qu'Appelle.
Swift Current.	Riding Mountain.
Moosejaw.	Manitoba House.
Moose Mountain.	Fort Alexander.
Brandon.	Sounding Creek.
Bad Hills.	Fort Pitt.
Yorkton.	Shell River.
Carlton.	Prince Albert North.

(b) On a scale of 6 miles to 1 inch:—

Wood Mountain.	Winnipeg.
Souris.	Spillimacheen.
Turtle Mountain.	Blackfoot.
Dufferin.	Red Deer Forks.
Emerson.	Rush Lake.
Macleod.	Regina.
Moose Mountain.	Qu'Appelle.
Portage la Prairie.	Riding Mountain.
Manitoba House.	Yorkton.
Fort Alexander.	Rocky Mountain House.
Sounding Creek.	Humboldt.
Bad Hills.	Pasquia.

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APPENDIX No. 8.

STATEMENT of work performed in the survey records office for the nine months ending March 31, 1907.

Files received and dealt with.. . . .	5,307
Letters drafted.. . . .	3,118
Reports, drafts, memos to council.. . . .	.....
Plans, tracings, &c., copied or compiled.. . . .	315
Statutory declarations, copied and mailed.. . . .	356
Plans sent to agents, registrars, &c.. . . .	19,911
Pages of field notes copied.. . . .	875
Prints of plans received and stored.. . . .	87,112
Original plans received and recorded.. . . .	657
Original field notes received and recorded.. . . .	540
Letters written to agents.. . . .	958
Registered parcels mailed.. . . .	1,281

Work done for Topographical Surveys and other branches.

Books searched for.. . . .	5,028
Books sent.. . . .	3,394
Books returned.. . . .	3,920
Plans searched for.. . . .	1,789
Plans sent.. . . .	1,421
Plans returned.. . . .	514
Volumes searched for.. . . .	86
Volumes sent.. . . .	55
Volumes returned.. . . .	45

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APPENDIX No. 9.

STATEMENT of work executed in the photographic office during the nine months ending
March 31, 1907.

FOR THE DEPARTMENT OF THE INTERIOR.

	4 x 5.	5 x 7.	8 x 10.	10 x 12.	11 x 14.	16 x 18.	18 x 20.	24 x 30.	30 x 36.	36 x 42.	42 x 48.	Total.
Dry plate negatives	328	204	6									538
Bromide prints...	375	317	127		571	12	91	131	14	12		1,650
Vandyke prints....			49	3	79	5	27	27	8	3	13	214
Silver prints.....	906	692										1,598
Photo-lithographs..					6		648					654
Wet plate negatives			66		82	616	94					858
Total	1,609	1,213	248	3	738	633	860	158	22	15	13	5,512

FOR THE GEOLOGICAL SURVEY.

	4 x 5.	5 x 7.	8 x 10.	10 x 12.	11 x 14.	16 x 18.	18 x 20.	24 x 30.	30 x 36.	36 x 42.	42 x 48.	Total.
Dry plate negatives	30	135										165
Bromide prints....			4		232	6						242
Silver prints	19	249										268
Wet plate negatives					1	1						2
Total	49	384	4		233	7						677

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APPENDIX No. 10.

STATEMENT of work executed in the lithographic office during the nine months ending
March 31, 1907.

Month.	Maps.		Townships.		Forms.	
	No.	Copies.	No.	Copies.	No.	Copies.
1906.						
July	5	2,150	60	6,000	1	140
August	4	1,200	35	3,500	9	5,925
September	5	2,300	55	5,500	6	925
October	19	6,250	73	7,300	5	1,280
November	6	1,950	63	6,300	6	4,580
December	5	1,950	59	5,900	9	5,760
1907.						
January	7	3,800	105	10,500	5	2,026
February	9	6,300	55	5,500	7	824
March	3	662	35	3,500	8	3,950
Totals ..	64	26,562	540	54,000	56	25,410

SUMMARY OF WORK FOR THE NINE MONTHS.

	Number of Jobs.	Number of Copies.	Number of Impressions.	Cost.	Cost per map or form.
				\$ cts.	\$ cts.
Maps	64	26,562	45,686	1,319 40	20 61
Townships	540	54,000	54,500	3,715 20	6 88
Forms, &c.	56	25,460	28,670	631 40	11 27
Totals ..	660	106,022	128,856	5,666 00	

APPENDIX No. 11.

Names and duties of employees of the Topographical Surveys Branch at Ottawa.
(Metcalfe street, corner of Slater street).

Deville, E., D.T.S., LL.D., Surveyor General.

CORRESPONDENCE AND ACCOUNTS.

Brady, M., secretary.
Hunter, R. H., accountant.
Wilkinson, Percy, assistant accountant.
Percival, M. F., stenographer and typewriter.
Cullen, M. J., stenographer and typewriter.
Pegg, A., messenger.
O'Leary, James J., messenger.

OFFICE OF THE CHIEF DRAUGHTSMAN.

Symes, P. B., chief draughtsman.
Shanks, T., B.A.Sc., D.L.S., assistant to chief draughtsman.

First Division—Instructions and General Information.

Brown, T. E., B.A., in charge of division.
Stacey, A. G., B.A., D.L.S., O.L.S.
Sylvain, J.
Green, W. T., B.A., D.L.S.
Durnford, F. G. D.
Weekes, M. B., B.A.Sc., O.L.S., D.L.S.
Mudie, J. M., Grad. R.M.C.
Carroll, M. J., Grad. S.P.S.
Cumming, A. L., B.Sc.
Seymour, H. L., Grad. S.P.S., D.L.S., O.L.S.
Umbach, J. E., Grad. S.P.S., D.L.S.
Dodge, G. B.
Burkholder, E. L.
Fitzgerald, C. C.
Kimpe, M.

Second Division—Examination of Surveyors' Returns.

Phillips, E. H., Grad. S.P.S., D.L.S., in charge of division.
Nash, T. S., Grad. S.P.S., D.L.S.
Empey, J., B.A.Sc., D.L.S., O.L.S.
Henderson, F. D., Grad. S.P.S., D.L.S.
Barber, H. G., Grad. S.P.S.
Burgess, E. L., Grad. S.P.S., O.L.S., D.L.S.
Hill, S. N., Grad. S.P.S.

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Dennis, E. M., B.Sc.
Elder, A. J., Grad. S.P.S.
Morrier, J. E.
Chilver, H. L., Grad. S.P.S.
McClennan, W. D.
Cram, A. S.
Owens, R. B., B.A., B.E.
Davies, T. A., D.L.S.
Elwell, W., Grad. S.P.S.
Roger, A.
Clunn, T. H. G.
Robertson, D. F., Grad. S.P.S.
Goodall, J. N., Grad. S.P.S.
Heathcott, R. V.
Rochon, J. W.
Macdonald, J. A.
Spreckley, R. O.
Marriott, F. L.
Brice, E. E.
Smith, C. C., B.A., D.L.S., O.L.S.

Third Division—Drawing Plans for Printing.

Engler, Carl, B.A., D.L.S., in charge of division.
O'Connell, J. R.
May, J. E.
Archambault, E.
Helmer, J. D.
Moule, W. J.
Bergin, W.
Hutton, J. B.
Moran, J. F.
Villeneuve, E. J.
Brown, A.
Tremblay, A.
Ball, J. C.
Shore, S. H.
Williams, E. R.

Fourth Division—British Columbia Surveys.

Rowan-Legg, E. L., in charge of division.
Gillmore, E. T. B., Grad. R.M.C.
Lawe, H., D.L.S.
Morley, R. W.
MacIlquham, W. L., B.Sc.
Weld, W. E.
Wilson, E. E. D.
Carson, P. A., B.A., D.L.S.

Fifth Division, 185 Sparks street—Mapping.

Smith, Jacob, in charge of division.
Bégin, P. A.
Lepage, J. B.

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Blanchet, A. E.
Grey, G. A.
Davies, T. E. S.
Belleau, J. A., D.L.S.
Taggart, C. H.
Perrin, V.
Smith, H. J.
Genest, P. F. X.

OFFICE OF THE GEOGRAPHER.

(Woods building, Slater street).

White, J., geographer.
Baine, H. E.
Chalifour, J. E.
Dumouchel, G. E.
Taché, H.
Darrach, M.
Wilson, H. W.
Akerlindh, A.
Anderson, W.
Blatchley, H. M.
Bennie, J.
Wood, C. G.
Craig, R. W.
Chandler, S.
Groulx, A.
Gagnon, J. S.
Inkster, F. B.
Blue, W.

SURVEY RECORDS OFFICE.

(Canadian building, Slater street).

Steers, C. J., clerk in charge.
Currie, P. W., B.A., B.Sc., D.L.S., assistant clerk in charge.
Surtees, W. S., draughtsman.
Sowter, T. W. E., draughtsman.
Smith, F. W., draughtsman.
Routh, C. F., draughtsman.
Ashton, A. W., draughtsman.
Lecourt, Eugène, draughtsman.
Moore, R. T., draughtsman.
Lambart, O. H., draughtsman and typewriter.
Belleau, Eugène, draughtsman.
Yielding, Miss A., typewriter.
Landry, Narcisse, messenger.

LITHOGRAPHIC OFFICE.

(Metcalf street, corner of Slater street).

Moody, A., foreman.
Thicke, H., power press printer.
Bergin, J., transferrer.

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Boyle, S., stone polisher.
Gagnon, J., press feeder.
Thicke, C., engraver and lithographer.

PHOTOGRAPHIC OFFICE.

(Metcalf street, corner of Slater street).

Topley, H. N., photographer in charge.
Carruthers, H. K., photo-lithographer and photo-engraver.
Woodruff, J., photographer.
Whitcomb, H. E., photographer.
Morgan, W. E., photographer.
Kilmartin, A., photographer.
Devlin, A., photographer.
Ouimet, Geo., photographer.

GEOGRAPHIC BOARD.

(Woods building, Slater street).

Whitcher, A. H., D.L.S., secretary.

APPENDIX No. 12.

EXAMINATION PAPERS OF THE BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS.

EXAMINATION FOR ADMISSION AS ARTICLED PUPIL—LIMITED PRELIMINARY.

XVII.

February 12th, 1907.

FIRST PAPER.

	Marks.
1. Penmanship and Orthography.	50
2. The eagle weighs 258 grains, nine-tenths pure gold ; 1869 sovereigns weigh 480 ounces Troy, eleven-twelfths pure gold. Find the value of one sovereign in terms of the dollar.	6
3. A man invests \$600 in 5 per cent stocks at 120 ; at the end of the year, having just received the yearly dividend, he sells at 121½. How much better off is he than if he had loaned his money at 5 per cent per annum ?	6
4. A certain number between 10 and 100 is eight times the sum of its digits, and if 45 be subtracted from it the digits will be reversed : find the number.	6
5. The sum of the reciprocals of two consecutive numbers is $\frac{1}{2}$: find them.	7
6. Prove geometrically $a^2 = b^2 + c^2 - 2 bc \cos A$.	7
7. Draw a straight line in a given direction so that chords cut from it by two given circles may be equal.	7
8. Find value of $(\frac{2}{3})^{\frac{1}{2}} + (\frac{3}{8})^{\frac{1}{2}} + (\frac{4}{9})^{\frac{1}{2}} + (\frac{1}{4})^{\frac{1}{2}}$.	7
9. Find the values of x which satisfy the following equations: $5x = \frac{1}{5}$, $10x = 23$, $13x = 117$, $3 \cdot 2x + 1 = 5 \cdot 3x - 1$.	7
10. Solve the equation $85 - 3x = 12 \cdot 4 - 2x$. having given $\log 2 = .30103$, $\log 3 = .47712$	7

SECOND PAPER.

	Marks.
11. Deduce the formula for the area of a triangle in terms of the three sides.	8
12. A hemisphere, a cylinder and a cone stand on the same base. If their heights are the same, compare their volumes and their areas.	9
13. Two simultaneous observations for altitude were made in the same vertical plane on a meteor at two places 3 miles apart; the respective elevations were 42° and 58°. What was the height of the meteor ?	9
14. Deduce $\tan(x+y) = \frac{\tan x + \tan y}{1 - \tan x \tan y}$ and $\tan^2 \frac{1}{2} A = \frac{(s-b)(s-c)}{s(s-a)}$.	9
15. Given $a = 13$; $b = 15$; $C = 107^\circ 30'$, find c .	9
16. Deduce $\tan^2 \frac{1}{2} a = \frac{-\cos S \cos(S-A)}{\cos(S-B) \cos(S-C)}$	9
17. Given $b = 99^\circ 41'$; $c = 100^\circ 50'$; $A = 65^\circ 33'$; find a .	9
18. Given $a = 120^\circ$; $b = 70^\circ$; $A = 130^\circ$; find C and B .	9
19. Given $a = 100^\circ$; $b = 50^\circ$; $c = 60^\circ$; find A .	9

SESSIONAL PAPER No. 25b

EXAMINATION FOR ADMISSION AS ARTICLED PUPIL—FULL PRELIMINARY.

XXIX.

February 12th to 15th, 1907.

PENMANSHIP AND ORTHOGRAPHY (PRELIMINARY AND FINAL).

Their was formally more suspishun among men than we find to-day. Sumtimes representashuns were made, folowed by coershun of each individuall.—

— Aggericultur is grately prommoated by the guvverment, so is forrestery. On the farm we see wheat, barly, oats, puttatos, terneps, carats, unnions, beens, marry-golds, sage, time, and menny other prodducks, wich when fotergrafted together or sepe-
rate make a verry prittie picashur, pervided one has a good cammera.—

— In fissiks the barommeter, thermommitter, and higerommeter are important insteraments or apperattus. Our ordernary sences are not verry accute, for, small chainges in heat are not perseptabel by them.—

— A plaice directly oppersite to ours is called antipperdease, and it would be resonible to assume that the climate their would be akseptible to us, not too riggerous nor too troppikle. Bannaners grow well in a moist, humite atmusfere, such as one finds on the vulcannic islands in the paciffic oshun, but termattos grow better whare the air and climait are more modderit and temperrit. The appel does not devellop at all in the troppicks.—

— The eliptissity of the earth is allways eggsaggurated in a diergram, the aktual ratio of the diammaters would not make the impresshun of an oblaite sferide.—

— Emmegrants are daly leeving Europe and immegrants are weakly arriveing in Montreal, and travule westwards to the furtle basons of the Bow and Sascatchwan rivers, where they find good land, good watter, good skules, and good nayburs.

ARITHMETIC AND LOGARITHMS.

(Time, 3 hours.)

Marks.

1. The discount on a note made February 27, 1906, at 3 months for \$1080 with interest at 5 per cent and discounted March 18 following was \$13.12. Find the rate of discount. 12
2. A sum of money at compound interest doubled itself in 18 years. Find the rate of interest. 12
3. How much gold 90 per cent pure must be mixed with 24 ounces 65 per cent pure so that the alloy may be 80 per cent pure? 12
4. A vessel has three taps A, B and C. By A it is emptied in 5 hours, by B in 7 hours, while C takes two-thirds as long as A and B together. In what time can the vessel be emptied by three taps together? 12
5. The logarithm of the product of two consecutive numbers is 2.4857214. Find the numbers. 13
6. Find value of $(\frac{1}{2}) - (\frac{1}{3}) + (\frac{1}{4}) - (\frac{1}{5})$ 13
7. Find angle, the logarithm of its sine being 9.6234562.
" " tangent being 0.2345678n.
" " secant being 0.3148923n. 13
8. Find logarithmic value for $\sin 92^\circ 13'$
" " $\cos 104^\circ 15'$
" " $\tan 85^\circ 17'$ 13

ALGEBRA.

(Time, 3 hours.)

	Marks.
1. Find the L. C. M. of $x^2-10x+24$; $x^2-8x+12$, and x^2-6x+8 ; and the H. C. F. of $6x^2-13x+6$; $2x^2+5x-12$, and $6x^2-x-12$.	12
2. Two-thirds of A's money is equal to B's; and three-fourths of B's is equal to C's; together they have \$650. How much has each?	12
3. Solve $\frac{3x-1}{2} - \frac{y}{4} = \frac{7}{2}$; $x+3y=9$.	12
4. Find a fraction which becomes $\frac{1}{2}$ on subtracting 1 from the numerator and adding 2 to the denominator, and reduces to $\frac{1}{3}$ on subtracting 7 from the numerator and 2 from the denominator.	12
5. Solve $\frac{21x^3-16}{3x^2-4} - 7x=5$.	13
6. Solve $x^2y^2-6x=34-3y$; $3xy+y=2(9+x)$.	13
7. Expand $(x+y)^5$ and $(x+y+x)^3$.	13
8. A person selling a horse for \$72, finds that his loss per cent is one-eighth of the number of dollars that he paid for the horse. What was the cost price?	13

PLANE GEOMETRY.

FIRST PAPER.

(Time, 3 hours.)

	Marks.
1. When in a triangle $a^2+b^2=c^2$ prove that C is a right angle.	12
2. The straight lines which bisect the angles of a triangle meet in a point.	12
3. Find the side of a square equal to a given rectangle.	12
4. Construct a rectangle equal to a given square such that the difference of two adjacent sides shall be equal to a given straight line.	12
5. Similar arcs of circles which have equal chords, are equal.	13
6. Inscribe a circle in a given triangle.	13
7. Describe a circle to touch a given circle and two given tangents to the circle.	13
8. Prove that the locus of a point whose distance from one of two fixed points is double that from the other, is a circle.	13

PLANE GEOMETRY.

SECOND PAPER.

(Time, 3 hours.)

	Marks.
9. Prove geometrically $(a-b)^2+4ab=(a+b)^2$.	12
10. The locus of the middle points of all chords drawn through a fixed point in a circle, is a circle.	12
11. Describe a circle about a given triangle.	12
12. Show how to cut off the corners of an equilateral triangle so as to leave a regular hexagon.	12

SESSIONAL PAPER No. 25b

13. If an angle of a triangle be bisected by a straight line which cuts the opposite side, the rectangle contained by the segments of that side is less than the rectangle contained by the other sides by the square on the line. 13
14. Similar triangles are to one another in the ratio duplicate of the ratio of two corresponding sides. 13
15. Bisect a given triangle by a line parallel to its base. 13
16. If an angle of a triangle be bisected internally or externally by a straight line which cuts the opposite side or that side produced, the ratio of the segments of that side is equal to the ratio of the other sides of the triangle. 13

PLANE TRIGONOMETRY.

Marks.

(Time, 3 hours.)

1. Prove that $\sin(A - B) = \sin A \cos B - \sin B \cos A$. 12
2. Prove that $\tan(A - 45^\circ) = \frac{\tan A - 1}{1 + \tan A}$ 12
3. Prove that $\frac{\sin 3A}{\sin A} - \frac{\cos 3A}{\cos A} = 2$. 12
4. Show that $\sin \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}$. 12
5. Given $a = 31.24$, $b = 49.00$, $A = 32^\circ 18'$, find c . 13
6. Given $a = 6.24$, $b = 2.35$, $C = 110^\circ 32'$, find A . 13
7. Given $A = 50^\circ 39'$, $B = 60^\circ 07'$, $a = 412.67$, find c . 13
8. Given $a = 13$, $b = 12$, $c = 5$, find C . 13

SPHERICAL TRIGONOMETRY.

(Time, 3 hours.)

Marks.

1. Prove $\cos a = \cos b \cos c + \sin b \sin c \cos A$. 14
2. Deduce $\cos^2 \frac{1}{2} A = \frac{\sin s \sin(s-a)}{\sin b \sin c}$ 14
3. State and prove Napier's rules for the solution of right-angled spherical triangles. 14
4. given $c = 140^\circ$, $a = 20^\circ$, $C = 90^\circ$, solve the triangle. 14
5. Given $b = 99^\circ 41'$, $c = 100^\circ 50'$, $A = 65^\circ 33'$, find a . 14
6. Given $A = 135^\circ 06'$, $C = 50^\circ 30'$, $b = 69^\circ 35'$, find B . 15
7. Given $A = 120^\circ$, $B = 130^\circ$, $C = 80^\circ$ find c . 15

MENSURATION OF SUPERFICIES.

(Time, 3 hours.)

Marks.

1. The sides of a field are 7.84 ch., 9.32 ch. and 10.56 ch., find its area. 14
2. What parallels of latitude would divide the surface of the earth into three equal areas? 14
3. If the surface of a sphere is changed to that of a tetrahedron, what is the edge of the latter? 14

4. How many yards of canvas are required for a bell (conical) tent 12 ft. high, 10 ft. in diameter and having a 3-foot wall? 14
5. What is the area of the regular pentagon inscribed in the circle whose radius is 10? 14
6. If in question 1 the chain was 5 inches too long what is the true area of the field? 15
7. What is the area of a triangle where
 $a = 14.68$ ch., $b = 17.32$ ch., and $C = 57^\circ 42'$? 15

EXAMINATION FOR COMMISSION AS DOMINION LAND SURVEYOR.

XXXVII.

February 12th to 19th, 1907.

ALGEBRA.

(Time, 3 hours.)

Marks.

1. Find the *H. C. F.* of $24 a^3 b^2 c^3$, $16a^3 b^4 c^2$, $40a^2 b^3 c^5$,
 And the *L. C. M.* of $x^3 - 15ax^2 + 48a^2 x + 64a^3$, and $x^2 - 10ax + 16a^2$. 11
2. Find the value of

$$\frac{1}{8-8x} - \frac{1}{8+8x} + \frac{x}{4+4x^2} - \frac{x}{2+2x^4}$$
 11
3. A regiment has food for m days; but if it were reinforced by p men, would have food enough for n days only. Find the number of men in the regiment. 11
4. A certain number between 10 and 100 is eight times the sum of its digits, and if 45 be subtracted from it the digits will be reversed; find the number. 11
5. Find the square root of $16x^6 + 16x^7 - 4x^8 - 4x^9 + x^{10}$ 11
6. Solve $\frac{21x^2 - 16}{3x^2 - 4} - 7x = 5$. 11
7. Solve $\frac{1}{x^3} - \frac{1}{y^3} = 91$; $\frac{1}{x} - \frac{1}{y} = 1$. 11
8. Find a number whose square diminished by 119 is equal to ten times the excess of the number over eight. 11
9. If a train travelled 5 miles an hour faster it would take one hour less to travel 210 miles; what time does it take? 12

PLANE GEOMETRY.

(Time, 3 hours.)

Marks.

1. Two parallelograms, which have two sides equal and in a straight line, and also have the sides opposite to the equal sides in a straight line, are equal. 15
2. The straight lines, drawn from the vertices of a triangle perpendicular to the opposite sides, meet in a point. 15
3. Prove geometrically $(a + b)^2 = a^2 + 2ab + b^2$. 15

SESSIONAL PAPER No. 25b

- | | |
|--|----|
| 4. The sum of the squares on the sides of a parallelogram is equal to the sum of the squares on the diagonals. | 15 |
| 5. Find the side of a square equal to a given rectangle. | 15 |
| 6. The largest rectangle, the sum of whose sides is given, is a square. | 15 |
| 7. Angles in the same arc of a circle are equal. | 15 |
| 8. The locus of a point at which a given straight line subtends a constant angle is an arc of a circle. | 15 |
| 9. To inscribe a regular polygon of fifteen sides in a circle. | 15 |
| 10. Prove that the bisectors of all the angles of any regular polygon meet in a point. | 15 |

SOLID GEOMETRY.

(Time, 3 hours.)

- | | Marks. |
|--|--------|
| 1. Only one straight line can be drawn through a given point at right angles to a given plane. | 8 |
| 2. Two intersecting planes cannot both be at right angles to the same straight line. | 8 |
| 3. The sum of any two plane angles of trihedral angle is greater than the third angle. | 8 |
| 4. The sum of the plane angles of any convex polyhedral angle is less than four right angles. | 8 |
| 5. Describe a sphere about a given tetrahedron (not regular). | 8 |
| 6. What are the linear dimensions of a sphere, cube, and equilateral tetrahedron having the same volume? | 8 |
| 7. What are the dimensions when the solids in the above question have the same surface? | 9 |
| 8. The axes of an oblate spheroid are 12 and 20. What is its volume? | 9 |
| 9. What is the volume of a prismoid, the length and breadth of its greater end being 24 and 16 inches, those of its top 16 and 12 inches, and its length 120 inches? | 9 |

SPHERICAL TRIGONOMETRY.

(Time, 3 hours.)

- | | Marks. |
|---|--------|
| 1. Show that $\cos a \sin b = \sin a \cos b \cos C + \sin c \cos A$. | 15 |
| 2. Deduce $\sin \frac{1}{2} a = \sqrt{\frac{-\cos S \cos (S-A)}{\sin B \sin C}}$. | 15 |
| 3. Deduce $\tan \frac{1}{2} (a-b) = \frac{\sin \frac{1}{2} (A-B)}{\sin \frac{1}{2} (A+B)} \tan \frac{1}{2} c$. | 15 |
| 4. Find the area of a spherical triangle | 15 |
| 5. Given $A=100^\circ$, $a=112^\circ$, $C=90^\circ$, solve the triangle. | 15 |
| 6. Given $b=98^\circ 02'$, $c=80^\circ 36'$, $A=10^\circ 16'$, find a | 20 |
| 7. Given $a=40^\circ 16'$, $b=47^\circ 44'$, $A=52^\circ 30'$, find B . | 15 |
| 8. Given $a=100^\circ$, $b=50^\circ$, $c=60^\circ$, find A . | 15 |

MEASUREMENT OF AREAS (FIRST PAPER).

(Time, 3 hours.)

	Marks.
1. To cut off from a quadrilateral any given portion by a line drawn from one of its angles.	16
2. To divide a triangle into two given parts by a straight line passing through a given point within the triangle.	16
3. In the triangle ABC , $AB = 14\text{ch}$, $BC = 13\text{ch}$, $CA = 15\text{ch}$. It is required to bisect it by a straight line running from BC to AB and making an angle of 60° with BC . What is the length of the dividing line?	16
4. If the northern hemisphere were covered with an ice-cap five miles thick, from the north pole to latitude 40° , when melted what depth of water would this give when spread over the whole earth, radius 4,000 miles, density of ice .9?	17
5. The half-mile line of a half-mile race track is composed of two equal tangents and of two equal circular arcs, the radius is 200 feet. What is the area enclosed by the half-mile line?	18
6. How many acres are included between the parallels of 49° and 50° and between the meridians 100° and 101° ?	17

MEASUREMENT OF AREAS. (SECOND PAPER.)

(Time, 3 hours.)

7. The notes of a survey of a piece of land are as follows:—

	CH	
1. N. $34^\circ 15'$ E.	2.73	
2. N. 85 00 E.	1.28	
3. S. 56 45 E.	2.20	
4. S. 34 15 W.	3.53	
5. N. 56 30 W.	3.20	40

Required, the area after first balancing the survey.

8. (a) Express the conditions necessary for a closed survey by two equations.
 (b) Show what missing data may be supplied and whether any ambiguity may arise.
 (c) How does the supplying of missing data affect balancing the survey? 20
9. Deduce the method of computing areas by 'latitude and departure.' 20
10. If in question 7 the azimuth of every course is in error $30'$, and a re-survey of the area were made with the proper azimuths beginning at the fixed point 1, what displacement in latitude and departure would station 3 suffer? 20

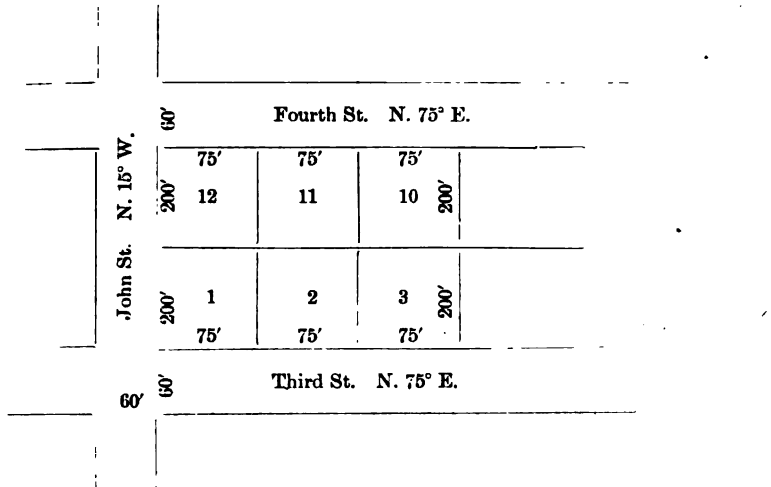
SESSIONAL PAPER No. 25b

DESCRIPTIONS.

(Time, 3 hours.)

Marks.

1.



The above is part of the registered plan of the town of Holly, in the county of Tweed and province of Alberta. A sells to B a part of Lot No. 1, and adjoining John and Third streets. The part sold is to have a frontage of forty feet on Third street, to extend to the rear of the lot, and the dividing line to be parallel to John street. Make a description for a deed.

25

2. Using the plan of question 1. Supposing A to own lots Nos. 1 and 2, he sells Lot No. 2 to B and gives the right of ingress and egress to B by a lane, 16 feet wide, running along the whole of the rear limit of Lot No. 1. Make the necessary description for the conveyance.

25

3. Moose Creek flows across the N.E. $\frac{1}{4}$ Sec. 12, Tp. 13, R. 15 W., in an easterly direction. B desires to buy the northerly part of the quarter section lying north of the creek together with the creek. From measurement the southerly bank of the creek intersects the eastern and western quarter section lines respectively at 22-12ch and 20-18ch from the northern quarter section line. The whole area to be conveyed is supposed to contain 85 acres. Make a description for a deed.

25

4. Make a description for the remaining part of the quarter section given in question 3.

25

ASTRONOMY. (FIRST PAPER.)

(Time, 3 hours.)

Marks.

1. (a) Define sidereal, mean, solar, and standard time.
- (b) When from an observed altitude of the sun at a given place we deduce the hour angle in degrees and then convert this into time, what kind of time is it? Why?
- (c) When similarly from an altitude of a star we compute the hour angle, what kind of time is it? Why?
2. Explain fully the equation of time, and show how and why it varies during the year, and that it vanishes four times a year.
3. What are the least and greatest values that the azimuth of Polaris at greatest elongation can have, and what are the respective latitudes?

13

13

13

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4. What is the standard time of greatest elongation (eastern) of Polaris in February 15, 1904, in latitude $45^{\circ} 25' N.$ longitude $75^{\circ} 43' W.$? 13
5. What is the sidereal time of rising of Arcturus ($\alpha=14^h 11^m 29^s$, $\delta=+19^{\circ} 40'$) on same date and place as in above question ? 12
6. On same date as above the observed altitude of Arcturus on the prime vertical was $72^{\circ} 13'$. What was the latitude of the place ? 12
7. On same date as above the observed meridian altitude of Arcturus measured from the north horizon was $70^{\circ} 20'$. What was the latitude of the place ? 12
8. On July 2, 1904, in longitude $110^{\circ} W.$, the meridian altitude of the upper limb of the sun at lower or northern culmination was $9^{\circ} 47'$. What was the latitude of the place ? 12

ASTRONOMY. (SECOND PAPER.)

Marks.

(Time, 3 hours.)

9. On June 21, 1904, at the township corner T. IV, V, R. V, VI, W. of 2nd M. at watch-time $8^h 15^m 30^s$ the observed altitude of the sun was $32^{\circ} 16'$. What was the azimuth and watch correction ? 17
10. In the above question what was the right ascension of a star which crossed the meridian at the time of observation of the sun ? 17
11. At the place in question 9, a pocket sidereal chronometer is fast on local sidereal time $8^m 17.8^s$, and has a daily losing rate of 4.5^s . Ten days later on the same base line the chronometer was found to be fast $10^m 32.5^s$. What was the exact position with reference to section corner, of the latter place of observation ? 17
12. The difference of meridian zenith distance between Arcturus and Polaris at lower transit was $35^{\circ} 09'$. What was the latitude of the place, $\delta=88^{\circ} 49'$, $\delta=9^{\circ} 40'$? 17
- Is there any ambiguity ?
13. What is the standard time of sun-rise at date and place in question 9 ? 16
14. What was the local mean time on June 21, 1904, when the shadow of a picket at Sec. 3-4, Tp. IV-V, R. V-VI, W. of 2nd M. fell on the base line ? 16

MANUAL OF SURVEY. (FIRST PAPER.)

Marks.

(Time, 3 hours.)

1. Define an initial meridian, a base line, and a correction line. Where are the initial meridians ? How is the deficiency or surplus in surveyed lines disposed of ? 20
2. Describe the different kinds of posts, mounds, pits and trenches used in the present system of survey. Show how and where they are placed. 20
3. How would you mark the following posts :
 - (a.) At the corner between Sections 13, 14, 23 and 24, Tp. 57, R. 21, east of the P.M.
 - (b.) At the south corner between Sections 31 and 32, Tp. 50, R. 7, W. of the 3rd M.
 - (c.) At the N. E. corner of Section 17, Tp. 42 A., R. 1, W. of 3rd M. (on the south side of the road allowance dividing two systems of survey.)
 - (d.) At the south corner of Tp. 51 between ranges 18 and 19, W. of 4th M.
 - (e.) At the witness mound placed at a distance of 6 chains west of the N. W. corner of Section 25, Tp. 15, R. 22, W. of the 3rd M. 20.

SESSIONAL PAPER No. 25b

4. How is a settlement surveyed? Give the rules to be observed in measuring a distance by means of a triangle. 20
5. Define a bearing and an azimuth. To what meridian is a bearing referred in subdividing a township and how is it deduced from an observed azimuth? 20

MANUAL OF SURVEY. (SECOND PAPER.)

(Time, 3 hours.)

- | | Marks. |
|--|--------|
| 6. How are the north and the south boundaries of a township surveyed?
When is a quarter section considered sufficiently surveyed for disposal?
What are the limits of error allowed in a subdivision survey? | 20 |
| 7. What is to be entered in the report made by a surveyor on the subdivision of a township? What is the date of a survey? | 20 |
| 8. What are the bodies of water in a township which have to be surveyed, and what are those which are not to be surveyed?
In what manner is a traverse made?
Give the rules governing the rights of riparian owners. | 20 |
| 9. Define, a resurvey, a retracement survey, a restoration survey, an obliterated monument and a lost monument. Give the rules governing the above surveys. Under what circumstances is a subdivider justified in resurveying or retracing a township outline? | 20 |
| 10. All the section and quarter section corners around section 34, Tp. 58, and section 3, township 59, range 13, W. of 2nd M. are lost, but the positions of the adjoining corners are known. How would you proceed to re-establish the lost corners? | 20 |

EXAMINATION FOR CERTIFICATE AS DOMINION TOPOGRAPHICAL SURVEYOR—SUPPLEMENTAL.

X

FEBRUARY 12TH TO 15TH, 1907.

ALGEBRA.

(Time, 3 hours.)

- | | Marks. |
|--|--------|
| 1. Find the number of (1) three digits, (2) of four digits in the denary scale such that if the first and last digits be interchanged the result represents the same number in the nonary scale, and prove that there is only one solution in each case. | 8 |
| 2. The whole number next greater than $(3+\sqrt{5})^n$ is divisible by 2^n . | 7 |
| 3. If on an average one vessel in every ten is wrecked, find the chance that out of 5 vessels expected, 4 at least will arrive safely | 7 |
| 4. The number of ways in which p things may be distributed among q persons so that everybody may have one at least is
$q^p - q(q-1)^p + \frac{q(q-1)}{\sqrt{2}}(q-2)^p \dots\dots\dots$ | 7 |
| 5. Show that if a, b, c, d be four positive unequal quantities and $s = a + b + c + d$ then $(s-a)(s-b)(s-c)(s-d) > 81abcd$. | 7 |

6. Solve the equation

$$\sqrt{x+27} + \sqrt[4]{55-x} = 4. \quad 7$$

7. In a shooting competition a man can score 5, 4, 3, 2, or 0 points for each shot: find the number of different ways in which he can score 30 in 7 shots. 7

PLANE TRIGONOMETRY.

(Time, 3 hours.)

Marks.

1. If $\phi = \frac{\pi}{13}$ show that

$$\cos \phi + \cos 3\phi + \cos 9\phi = \frac{1 + \sqrt{13}}{4}$$

$$\text{and } \cos 5\phi + \cos 7\phi + \cos 11\phi = \frac{1 - \sqrt{13}}{4} \quad 9$$

2. Having given the equation

$$\frac{\cos \alpha}{\cos \theta} + \frac{\sin \alpha}{\sin \theta} = -1$$

prove that

$$\frac{\cos^2 \theta}{\cos \alpha} + \frac{\sin^2 \theta}{\sin \alpha} = 1. \quad 8$$

3. If $\sin A, \sin B, \sin C$, be in harmonical progression so also will be $1 - \cos A, 1 - \cos B, 1 - \cos C$. 8

4. Sum the following infinite series, and the corresponding series in sines : 8
 $\cos \theta + \frac{1}{2} \cos 2\theta + \frac{1}{3} \cos 3\theta + \dots$

5. Demonstrate Euler's formulæ:

$$\cos x = \frac{1}{2} (e^{x\sqrt{-1}} + e^{-x\sqrt{-1}})$$

$$\sin x = \frac{1}{2\sqrt{-1}} (e^{x\sqrt{-1}} - e^{-x\sqrt{-1}}) \quad 8$$

6. Develop the sine and cosine of the multiple angle in a series of ascending powers of the cosine of the simple angle. 9

ANALYTICAL GEOMETRY.

(Time, 3 hours.)

Marks.

1. An ellipse and a parabola have a common focus, and the other focus of the ellipse moves on the directrix of the parabola. - Show that the points of contact of a common tangent subtend a right angle at the common focus. 10
2. (a) Find the equation of the evolute of the common parabola.
 (b) Show that a (produced) normal to an involute is tangent to the evolute, the point of tangency is the centre of curvature and consequently the normal thus produced is the radius of curvature. 10

SESSIONAL PAPER No. 25b

3. (a) Determine the asymptotes of the locus $x^3 - xy^2 + ay^2 = 0$ by developing $y = f(x)$
- (b) Produce the formulae for passing from a polar to a rectangular system of co-ordinates. 10
4. (a) Produce the polar equation of a conic section.
- (b) What is the polar equation of an ellipse whose axes are 12 and 8, the pole being at the focus? What are the focal distances? 10
5. Two tangents TP, TQ to an ellipse meet any other tangent $P^1 Q^1$, prove that $PP^1 \cdot QQ^1 = TP^1 \cdot TQ^1 \cos^2 \frac{\alpha - \beta}{2}$; where α and β are the eccentric angles at P, Q. 13
6. The equation of the straight lines which pass through the origin and make an angle α with the straight line $x + y = 0$ is $x^2 + 2xy \sec 2\alpha + y^2 = 0$. 12
7. (a) The eccentric angles of the vertices of conjugate diameters differ by 90° .
- (b) Any chord which passes through the focus of an ellipse is a third proportional to the transverse axis and a diameter parallel to the chord. 10

THEORY OF LIMITS AND DIFFERENTIAL CALCULUS.

(Time, 3 hours.)

Marks.

1. Define 'limit.' 3
2. Prove geometrically that the area of a circle is equal to that of the regular circumscribed or inscribed polygon, in the limit when the number of sides of the polygon is indefinitely increased. 10
3. In a triangle ABC , a point D is taken in AB , and a point E in AC produced, CE being m times BD . Find the point of ultimate intersection of BC and DE , when BD and CE are indefinitely diminished retaining always the same ratio to one another. 10
4. Find the volume of the portion of a paraboloid of revolution included between the vertex and a plane perpendicular to the axis and at a given distance from the vertex. (A geometrical solution will be preferred). 10
5. Differentiate

$$\tan^{-1} \frac{x}{a}; \quad (\cos x)^{\cos x};$$

$$\cos^{-1} e^{ax} - e^{-ax}.$$

9

6. Expand in ascending terms of x to five terms

$$x e^{-a^2 x^2} \cos r x.$$

9

7. Given two sides a and b of a spherical triangle find the variation in the side c and the angles A and B due to a small variation of the angle C . 10
8. With the data of the last question express A in a series in terms of a , b and C when the angle B is very nearly a right angle. 14

GEODETIC SURVEYING.

Marks.

(Time, 3 hours.)

1. Deduce the formula for reducing a base line to sea-level.

20
2. Deduce the formula for the effect of a deflection of the plumb-line upon an observed azimuth.

20
3. Given the pull, length and weight of a tape, deduce the formula of the correction for sag.

20
4. Describe a modern base line apparatus for primary triangulation and its use.

20
5. How would you run between two points of the same observed latitude a line having the curvature of the parallel of said latitude. Deduce the formulæ.

25
6. Find the difference of altitude of two stations from their reciprocal zenith distances, assuming the refraction to be equal for both.

25
7. Deduce a formula for the ellipticity of the earth from the length of the seconds pendulum at two places.

25
8. Having observed the angles between three known points from a fourth point deduce a formula for the distance of the fourth point from each of the others.

25
9. Given the latitude of a place find the radius of curvature along a given azimuth.

20

ASTRONOMY. (FIRST PAPER.)

(Time, 3 hours.)

Marks.

1. From the following ephemeris of the moon:

Mar. 3, 12 ^h	R.A.	20 ^h	28 ^m	17 ^s .88
4, 0		20	58	57.08
4, 12		21	29	02.01
5, 0		21	58	28.39
5, 12		22	27	15.43
6, 0		22	55	25.50
6, 12		23	23	03.39

- find the difference of the moon's right ascension in one minute for March 5, 0^h.

17
2. To find the parallax of a star in zenith distance and azimuth when the apparent zenith distance and azimuth are given, the earth being regarded as a spheroid.

17
3. In the method of observing for time by an observation of Polaris and of a time star in the same vertical, as given in the Manual of Dominion Lands, show the derivation of the formula of p (the arc of a great circle from the pole perpendicular to the above vertical)= $P \sin (t-t')$
$$P^2 + 2 \sin 2 (t-t') \tan \delta \dots\dots\dots$$

17
4. If a, a' are the hour angles in degrees of the sun at Greenwich at t and t' hours mean time, deduce the equations of time at the preceding and following mean noons, expressed in fractions of an hour.

17
5. Find the R.A. of the sun at true noon on October 8, 1906, given that the equation of time for that day is $12^m 13^s$, and that the sidereal time of mean noon on March 21 was $23^h 52^m 22^s$.

16
6. On February 19, 1906, in latitude $43^\circ 25' N.$, longitude $73^\circ 42' W.$, what is the standard time when α and δ Orionis are in the same vertical plane?
 $\delta \alpha = 7^\circ 28' N. \quad \alpha \alpha = 5^h 50^m$
 $\delta \delta = 8^\circ 19' S. \quad \alpha \delta = 5^h 10^m$

16

SESSIONAL PAPER No. 25b

ASTRONOMY. (SECOND PAPER.)

(Time, 3 hours.)

7. In Taicott's method for latitude deduce the formula for reduction to the meridian:

(1) When the line of collimation of the telescope is off the meridian, the instrument having been revolved in azimuth and the star observed at the hour angle T near the middle thread, then

$$M = \frac{2 \sin^2 \frac{1}{2} T}{\sin 1''} \cdot \frac{\cos \phi \cos \delta}{\sin \xi}$$

(2) When the star is observed off the line of collimation, the instrument remaining in the plane of the meridian, then

$$M = \frac{2 \sin^2 \frac{1}{2} T}{\sin 1''} \cdot \frac{1}{2} \sin 2\delta \quad 16$$

8. (a) In determining equatorial intervals of threads by stars within 10° of the pole, deduce the formula

$$(i_n = (t_n - t) \cos \delta \sqrt[3]{\cos T_n})$$

where T_n is the hour angle of the star for the respective threads.

(b) Give formulae for level constant including inequality of pivots when angle of the V of the level is not the same as of V of the transit. 16

9. As a ship starts from Liverpool its chronometer indicates 0^h and is correct by Greenwich mean time. After 16 days, as it reaches Quebec the chronometer indicates $7^h 00^m 23^s$, and Quebec time is $2^h 05^m 42^s$. Nearly 7 days afterwards the ship departs at Quebec noon, the chronometer then reading $4^h 54^m 39^s$; and when it reaches Liverpool after a voyage just over 14 days it is found to be 17^s slow by Greenwich mean time. What is the longitude of Quebec? 17

10. Deduce the general formula (Mayer's) for the transit instrument in the meridian

$$T = a \frac{\sin (\phi - \delta)}{\cos \delta} + b \frac{\cos (\phi - \delta)}{\cos \delta} + \frac{c}{\cos \delta}$$

11. Deduce the formula for finding the latitude from the observed transits (a number of threads) over the prime vertical, east and west of the meridian, when the instrument is reversed at each transit between the observations of the star on opposite sides of the prime vertical (Struve's method). 17

12. (a) At sidereal time t the zenith distance of a given star is ζ and at time t^1 the zenith distance is ζ^1 . Find the latitude and express it in terms of the data.

(b) On March 24 at noon the sun's declination was $1^\circ 29' 05''.1$ and the difference of right ascension of the sun and a star $6^h 01^m 54^s.45$. On September 18 following at noon the sun's declination was $1^\circ 49' 30''.2$, and it was distant from the star $5^h 27^m 32^s.97$ in right ascension. On September 19 at noon the sun's declination was $1^\circ 26' 12''.8$, and it was distant from the star $5^h 31^m 08^s.3$ in right ascension. Find the right ascension of the star and that of the sun at the first observation. 17

THEORY AND USE OF INSTRUMENTS.

(Time, 3 hours.)

	<u>Marks.</u>
1. Describe a modern form of level instrument for geodetic levelling.	20
2. Explain the different methods in use for the determination of the col- limation of an astronomical transit.	15
3. Describe Ramsden's and Huyghen's eye-pieces. How are the diaphragm threads illuminated for nadir observations with a mercurial horizon?	15
4. How would you investigate the figure of the pivots of an astronomical transit?	20
5. Describe the Kew Dip Circle and its use for the determination of inclina- tion and intensity.	20
6. Explain why temperature affects the rate of a watch and how its effect is corrected. If you wish to make your chronometer run faster or slower without altering its temperature compensation, which of the balance screws will you turn?	15
7. How do you explain the large errors in heights measured with an aneroid as compared with measurements by the mercurial barometer?	15
8. Define isobars and their connection with the direction of the wind in the northern hemisphere. Define relative humidity and dew-point.	15
9. Convert Fahrenheit's degrees to Centigrade and Reaumur.	15

REPORTS OF SURVEYORS

GENERAL REPORTS OF SURVEYORS

1906-1907

APPENDIX No. 13.

REPORT OF C. F. AYLSWORTH, JR., D.L.S.

SURVEYS AND RESURVEYS IN EASTERN MANITOBA.

MADOC, March 13, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour, in accordance with my instructions dated April 17, 1906, to submit the following general report on my survey operations during the season of 1906.

I left home on Monday, April 23, after having returned from Kingston, where I interviewed several young gentlemen of Queen's University with whom you instructed me to consult previous to their joining my party.

I arrived in Winnipeg on April 29, and immediately proceeded to organize a party and purchase my supplies. The labour question is the burning one of the west, as men are not at all obtainable in proportion to the demand. It is therefore very difficult to organize a satisfactory party; and I was occupied in this for several days. But after getting the party organized and having the outfit delivered at Beausejour, we all left Winnipeg for that place on Friday, May 4. We arrived there at noon, got the outfit unloaded and tents up and began the surveyor's usual life. We were engaged for a few days in putting the outfit in order. Beausejour is an old friend of mine, having been engaged in surveys there during the year 1900 for ten months. I found the town has progressed most remarkably since that time; there were general stores in abundance; a chartered bank, churches, hotels, lawyers, doctors, real estate agents and one of the most attractive schools in the province of Manitoba (constructed of cement blocks) and also all the necessary tradesmen the surrounding country and town requires.

While I was there a company was organized to construct, equip and operate a glass factory. The peculiar quality of the sand in the district is especially adapted to the manufacture of glass. This, of course, will be a very great boon to Beausejour if the experiment proves successful. The factory is built right on top of the sand required to manufacture the glass and the sand is there in unlimited quantities. This gives the company an immense advantage. I remember about thirty years ago a factory was built and operated for a time in the town of Napanee, Ontario, but the disadvantage there was that the owners were compelled to transport the suitable sand for glass making purposes from Brockville, Ontario, and on account of sundry other handicaps they could not manufacture glass in Napanee within twenty per cent of the price of the glass imported into and sold in Canada. The gentlemen comprising the Beausejour glass enterprise are all Germans, who come from the country where glass is successfully manufactured and where glass-blowers are trained to perfection. The company seems to be erecting a good class of buildings and have such confidence in

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the future success of their venture that they are making a large outlay of capital. Another industry that has been started there and whose output of goods cannot cope with the demand is a cement block equipment. These blocks when utilized in the construction of buildings are permanent, and present an especially attractive appearance. Then again, they are manufacturing a very superior quality of steam-dried white brick.

The development of the agricultural resources of the Beausejour district is as yet in its initial stage. North, south, east and west of the town, the farmers, generally speaking, are Galicians, Poles, Bohemians, Russian-Germans and Germans of a very industrious type. In fact the district through which I was operating last season is very thickly settled. In many cases the quarter sections are divided into legal subdivisions of forty acres each, and each legal subdivision is occupied. These people have not as yet begun the production of wheat for the market, confining themselves merely to the clearing and fencing of their farms and building for themselves comfortable houses. As a result there has been no demand as yet for elevators in Beausejour. The main travelled road leading north from that town between ranges 7 and 8 is so closely settled that it resembles a trip through the suburbs of a city. Their dwellings present a neat and attractive appearance, the windows being decorated with curtains and flowers. The people take a deep interest in the education of the rising generation; their schools are numerous and well patronized. They also look diligently after their religious and spiritual welfare by providing attractive, commodious and substantial places of worship. From Beausejour northerly for a distance of twelve miles, there are no less than three churches, located as follows:—One on section 7, township 14, range 8; one on section 18, township 14, range 8, and another on section 6, township 15, range 8. In addition to the services held in these attractive edifices, services are conducted in the different schoolhouses throughout the district. These numbered four or five, so that there was no reason why the members of my party should not have good and proper religious disciplining.

In townships 13, 14 and 15, ranges 7 and 8, in the neighbourhood of one hundred and fifty thousand dollars has been expended within the last two years for drainage purposes and the cost assessed against the adjoining lands. The material from the ditches has been thrown up and formed into a road-bed and nearly all the roads have thus been assisted, and rendered in a manner passable, except in those portions of the townships lying east of Brokenhead river. In this portion not nearly so many miles of drainage have been constructed as on the west side of the river and the eastern district is of such a swampy nature that the roads there are not passable except in a very few places. At any rate ditches east of that river have been constructed only along the east and west road allowances although all the north and south road allowances have been cleared of timber and scrub.

The people generally are not all satisfied with the manner in which this ditching has been executed. They feel that the cost has been excessive and that the work has not been efficiently done. In a great many cases the water must flow up grade in order to reach the outlet, viz.: Brokenhead river. One of these instances, I might be permitted to mention, is along the north boundary of sections 35 and 36, in township 13, range 7. Then again in a great many cases the material has been thrown up to form a roadbed without leaving any berm. As a result the material easily slides back into the ditch and makes travelling with vehicles dangerous. While the ground is frozen one might as well try to ride longitudinally along a large water soaked saw-log for the experience of sliding and sluing would be about the same, and unless these defects are remedied many actions will arise against the municipality for damages.

I would not have mentioned this feature of the conditions in Brokenhead district only that the statement of these facts assists in explaining a great difficulty I met with during the progress of my survey. In your instructions to me the third clause read: 'The petitions have already been forwarded to be circulated in the townships and to be signed by all owners or homesteaders.' Well, when I arrived there I found that not a single name had been attached to these petitions; that even the

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councillor representing the constituency in which the work was to be done would not sign or circulate it. He was the councillor who introduced the resolution into the Brokenhead council requesting the government to have the corners re-marked. Then when I arrived I found the people who had signed the petition asking to have the drainage plan carried out, so enraged that they refused to sign another petition of any description. Then a few of these who were opposed to the survey on other grounds, industriously circulated the report that the people had been deceived by being told that they would not have to pay anything for the drainage and that they would be deceived the same way in this matter and would eventually have to pay for this survey. I mention this as a sample of the opposition with which I had to contend. They also said I was going to upset the old corners and shift the roads and thereby cause them to lose their improvements. But when I saw how groundless all this opposition was it made me all the more determined to set matters right, especially when I saw that a great many people seriously wanted to have their corners made according to the manner of instructions. It occupied a great deal of time and required a great deal of patience to induce many of the people to sign the petitions. Another class whom I could not approach at all were those who owned large farms, who knew they had larger farms than their neighbours and were afraid they would possibly be deprived of a portion of their holdings.

I think I have gone into this feature of my report sufficiently deep to give you an idea of the difficulties I had to contend with. Also on account of very few of the people being able to speak English, my progress was rendered all the more difficult. Then again the people said they had been taken advantage of in signing papers for other propositions—so that taking everything into consideration when a man comes around with a paper asking them to sign it they generally refuse to have anything to do with it. One man after a rather heated argument said 'Well, I will sign this, but if I am deceived through it, I will never sign another paper even for the preacher.' But all this opposition did not deter me in the least from plodding away, and now I fancy that if a surveyor were to return there to complete the work I was instructed to do that every man of them would sign without having to be asked. In fact, a little previous to my departure from that district I heard that such was the case.

I found that the original lines, more especially in township 14, range 8, had been surveyed in an exceptionally irregular manner. And when such is the case and roads are constructed and fences erected and the people do not gather the necessary evidence, I found it impossible in some cases to establish the corners. There is very serious confusion as to where the original corners were, especially at the northeast corners of sections 12, 24, 25 and 36 in township 14, range 7; also at the northeast corner of section 19, township 14, range 8. There are other minor cases of quarter section corners that were not established, because the interested parties would not sign the petition, but they will ultimately be settled in all probability. In the case of sections 12, 24 and 25 and section 19, the location of the exact site of the original corner is a question of evidence. The interested settlers did not show any desire to gather the necessary evidence to locate those corners, the people, who could establish the corner under oath, having moved away. I did not observe any provision in your instructions authorizing me to pay witness and transportation fees of these people to give such evidence. However, the people interested told me that evidence to establish the corners could be procured, so I followed your instructions and left these corners for them to settle amongst themselves. Then again, at the northeast corner of section 36, township 14, range 7, the original corner was lost, but the settlers all signed the agreement to abide by my corner. But after I had planted a hub at the true corner (and where many old settlers said the old post stood) some of those who had signed the petition objected. I may add that the original lines here are very seriously in error. Some of the settlers who had signed the petition consulted Winnipeg lawyers as to the legality of my position for this corner. I therefore considered

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it preferable not to take advantage of their having signed the petition being ignorant at the time as to where I would locate the corner, and I decided not to establish the corner. Months afterwards when I was too far away to return and establish the corner where I planted the hub, those who had objected in the first instance, requested me to return, as they were now satisfied, but it was impossible for me to return and do so.

Permit me to frankly inform you that when I first began the survey between ranges 7 and 8 across township 14 that I was much discouraged as to whether I could make a success of it, for the following reasons. Two years ago they had engineers surveying the ditches that I have already described; these ditches were to run along the road allowances north and south, and east and west, but they do not appear to have adopted any systematic plans of laying out the ditches, along this town line especially. The west side of the ditch in a great many instances coincided with the survey line for the west boundaries of the road allowance, and one was not sure that, when the engineers found the original post, they took pains to replace it where they found it. (I do not mean deliberately.) Neither was I satisfied that the workmen during the construction of the ditches did not unwittingly disturb the post. Perhaps my fears were groundless, and I do not even suggest that anyone wilfully moved a post, but here were all these factors that contributed in no small degree to my uneasiness. Every corner I did establish is perfectly satisfactory to all parties, and I renewed nearly all excepting the ones I have already mentioned, but where there was the slightest possibility of a future misunderstanding I left them, as you have instructed, to be settled through the courts. I did not in any case ride rough shod over the objections of any man so that I trust that if I have erred, that I have erred on the safe side by not doing anything that would compromise your department in the event of legal complications. Excepting with the cases I have mentioned I have had very little difficulty with the balance of the survey barring the signatures to the petitions, all of which I am herewith submitting to you.

Between August 18 and September 7, I resurveyed township 10, range 7, east of the principal meridian. Petitions had already been circulated in the township for signature, and all signed them excepting one settler, who for some reason would not consent to add his name when it was being circulated. However, after I had completed the survey, he was so well satisfied that he volunteered to sign, but as I did not anticipate any trouble, I did not deem it necessary to have his name added to the list which had already been forwarded to you.

The new Grand Trunk Pacific railway passes through this township and runs nearly parallel to the north boundary. They are making an exceptionally serviceable and permanent roadbed. I am told that the grades are easy and that there is only one curve between Winnipeg and where it crosses the main line of the Canadian Pacific railway in the neighbourhood of Rennie station. The curve I have mentioned is caused by a desire to cross the Dugald dump on the third correction line as abruptly as possible in order not to unnecessarily interfere with traffic along the highway. Owing to the fact that the railway was so parallel to the highway when they were crossing they would necessarily follow it so far that the public became alarmed, and the council of the municipality requested this curve. The soil in this township is of a limestone gravelly nature, but still the few real farmers who are in the township produce a surprisingly large quantity of grain.

Please observe that I have not in my notes discriminated in detail between the scrub, bush and cultivated lands. My reason for this departure is that the people were clearing the land so rapidly that where it is bush, scrub and prairie to-day it is cultivated and growing crops to-morrow. In conclusion I desire to take this opportunity to thank all the members of my survey party for their loyalty and support to me during the past season; as is generally the case with me I did not have a particle of trouble.

I have the honour to be, sir,

Your obedient servant,

C. F. AYLSWORTH, JR., D.L.S.

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APPENDIX No. 14.

REPORT OF DAVID BEATTY, D.L.S.

RETRACEMENT SURVEYS IN SASKATCHEWAN.

PARRY SOUND, March 28, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on my survey operations for the season of 1906, under your instructions bearing date April 20, 1906.

I left Parry Sound on May 19, for Battleford, where I had stored my camp outfit in the fall of 1905. I stayed a day in Winnipeg to buy tents, &c., as some of my old outfit was not in good condition. I went from Winnipeg to Battleford via the Canadian Northern railway. After reaching Battleford I was delayed four days hunting for horses which would be suitable for the work and at reasonable prices. On the fourth day I bought four horses and brought in two of my own which I had wintered at a ranch south of Battleford, and started four men with the outfit across country to Prince Albert. I afterwards bought two horses at Thompson's ranch in September. I went by train to Prince Albert, where I hired other men to make up my party. My outfit arrived at Prince Albert on June 4, and after resting my horses for a day I moved up to Sturgeon lake on the 6th, and commenced work by first running the boundary line between ranges 27 and 28, township 51, west of the second meridian. I destroyed the old monuments that had been built one chain east of the Indian reserve line. I then made a survey of that part of Sand lake which is in township 51, range 27 and resurveyed such portion of said township as I thought necessary. No settlers have come into the township since 1903, although a considerable portion of it will make fairly good farming land when cleared of the poplar timber. I found the country very difficult to survey, on account of high water in the numerous swamps and sloughs, and after receiving your permission to go into work north of Radisson and return to the Prince Albert work in the fall, I moved my outfit into township 45, range 9, west of the third meridian, arriving there July 9. I made a resurvey of about two-thirds of the lines in the township and continued my resurvey work through townships 45, 44, 43, 42, 41, range 10 and townships 44, 43, 42 and 41, range 11. In some of the townships I resurveyed all the lines. When I had finished the resurvey of township 42, range 10, I moved over to Redberry lake on September 9, and surveyed four islands, as directed, before going into township 42, range 11. After completing the resurvey of township 41, range 10 on October 10, I moved my outfit into township 38, range 13, and made a resurvey of the block composed of sections 28 and 33. From there I moved north again to township 49, range 1, west of the third meridian, going by way of Aldina, and made a survey on October 26 of that part of a lake which extends from Mistawasis Indian reserve into sections 30 and 31, township 47, range 6. I reached township 49, range 1, and commenced a resurvey of the same and continued the survey through township 50, range 1, west of the third meridian, and townships 50, ranges 28, 27 and 26, west of the second meridian. I resurveyed such lines only as I thought were necessary. I came into Prince Albert on December 12, settled with my party, stored my outfit and took my horses to their winter quarters and arrived home on December 19.

I have the honour to be, sir,

Your obedient servant,

DAVID BEATTY, D.L.S.

APPENDIX No. 15.

REPORT OF P. R. A. BELANGER, D.L.S.

MISCELLANEOUS SURVEYS IN THE PROVINCES OF MANITOBA, SASKATCHEWAN AND ALBERTA.

OTTAWA, ONT., March 19, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa, Ont.

SIR,—I have the honour to submit the following report on my different survey operations during last year in the provinces of Alberta, Saskatchewan and Manitoba.

In compliance with your instructions dated January 23, 1906, notifying me that I had been appointed chief commissioner for the investigation of halfbreed land claims at Lac la Biche, in company with Reverend Father H. Grandin and Mr. Wilfrid Gariépy, barrister of Edmonton, I left for Edmonton on February 26, and after meeting the other two commissioners and having made all the necessary arrangements for transport and board, we left Edmonton together on March 7 for Lac la Biche, and reached that place on the 11th.

The next day the commission began its work, and held sittings for a whole week, hearing and investigating all claims that were made and which cover mostly all the lots in the settlement.

No conflicting claims were presented, and I am glad to say that all claimants appeared to be satisfied with our decision, and proved their satisfaction by an address they presented us, expressing their gratitude for our dealings in the matter.

A full report on all the claims investigated was forwarded on March 27 to the secretary of the department, giving our ruling in each case, and recommending the action which in our judgment should be taken to give satisfaction to the claimants. Not having seen the settlement since I surveyed it in 1889, I expected to find great improvements, but I regret to say that I was much disappointed; the farming which was carried on in those days to a certain extent has been abandoned. The land which was then cultivated is now overgrown with scrub, and the inhabitants seem to care only for fishing, trapping and freighting to make their living. The land, however, is first class, and the climate would permit of raising all kinds of cereals and vegetables, but as long as it remains in the possession of the present settlers it is bound to remain uncultivated.

On my return to Edmonton I received instructions from the secretary of the department notifying the commissioners to proceed to Lake St. Ann and make a similar investigation into claims preferred by the settlers of that place; but after conferring together on this subject, it was decided to postpone the investigation until the roads should improve. In the meantime Rev. Father Grandin agreed to notify the settlers that the commissioners would be at Lake St. Ann by the end of May to investigate their claims.

Having nothing to occupy me during this interval, I returned to Ottawa and subsequently returned to Edmonton where I arrived at the beginning of May to continue the investigation. Owing to the delay occasioned by the resignation of one of the commissioners, the legal adviser, and before another one had been regularly appointed, it was the 2nd June before we could proceed to Lake St. Ann.

During this interval of delay at Edmonton, I supervised the organization of survey parties by supplying the surveyors with horses, vehicles and other articles of transport, belonging to the department and found suitable for another season's service. I also made arrangements for the disposal of the balance of all survey outfits for which there was no further use.

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On the 2nd June, the commission of inquiry being once more fully organized, we proceeded to Lake St. Ann where we remained till the 8th, hearing and investigating all claims submitted to us, and on the 18th of the same month I submitted the full report of the commissioners to the secretary of the department.

During this investigation we had to deal with conflicting claims for lot 20 of the settlement, but as I had made the survey of that lot in 1889, and having in my hands the original notes of that survey, I was in a position to help the commissioners to adjust the claim and detect the rightful claimant notwithstanding the contradictory evidence given by one of the interested parties.

The remainder of June was taken up in finally disposing of the survey outfits, and investigating into the necessity of making the resurveys applied for in the vicinity of Mewassin, and on which I reported at the time.

On July 1, I left Edmonton for Yorkton where I had instructions to organize a small party and make some verification concerning the discrepancy in description of survey marks as restored in 1902 and 1903 compared with the original description.

After spending a few days at Yorkton for the purchase of my outfit and hiring men, I proceeded to File hills where I began operations. The investigation was carried over many townships in File hills and Touchwood hills, and covered a large tract of country. It was also extended to several townships in the southeastern part of Saskatchewan adjoining Manitoba along the Arcola branch of the Canadian Pacific railway.

Annotated sketches were sent to you during the season showing the verification made for all corners called for by your memorandum and also the rectification applied when necessary. This work occupied me till the middle of September after which according to new instructions, I made the traverse of a few lakes in different townships near the western boundary of Manitoba, and also removed some witness marks which had originally been placed in the road allowances.

On the completion of this work I left Kamsack on October 11 for Touchwood hills and Prince Albert for the purpose of examining survey contracts. On the way I passed through Veregin, Buchanan and another Doukhobor village situated at about two miles west of Buchanan, and I must say here that never before on my different expeditions was I better impressed than by the sight I enjoyed in passing through these villages. All the houses lie in rows at a few feet distant from one another, and are built with great symmetry and appear very neat and clean. This socialistic manner of building villages has certainly an advantage in allowing the inhabitants to visit and assist one another in case of emergency. These Doukhobors are a very moral, quiet and industrious people and notwithstanding their occasional foolish pilgrimages they are undoubtedly desirable settlers. They have already cultivated a large area of their land and their crops rank among the best in the locality.

On October 25, having finished the examination of the part of the survey contract No. 11 of 1906, which was ready for inspection, I proceeded via Wadena and Melfort to Fort à la Corne, where I inspected survey contract No. 18 of 1905, after which I spent the remainder of the season examining contract No. 12 of 1906 north of Prince Albert. Separate reports on the inspection of each of these contracts have already been submitted to you, and I do not see that much can be added to them. The country covered by these three contract surveys is more or less timbered but the timber is of no commercial value; it is good only for fuel, fencing and building purposes, except, however, in Mr. Montgomery's contract north of Prince Albert where railway ties can still be found in paying quantities though thousands of them have already been cut.

A belt of open land is found in contract No. 18 along the south bank of Saskatchewan river in townships 49 and 50, ranges 15, 16 and 17, west of the second meridian. It is very suitable for mixed farming, and at the time of the inspection I was informed that all the part available for homesteading was already taken up, and settlers were coming in to take possession of their new homes.

In contract No. 12 which is due north of Prince Albert there is very little land

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suitable for immediate settlement. The country is mostly all timbered and broken by numerous lakes and swamps. However, some settlers have already forced their way through this forest, and appear satisfied with their lot. Here as well as through the whole of the northern part of Prince Albert and Fort a la Corne districts the odd numbered sections with the exception of the school lands, should all be reserved for homesteads in order to encourage settlers to group themselves into small colonies over the small tracts of land suitable for farming purposes, and until this is done the settlement of this country cannot progress very much.

The lumber trade which is now carried on in a large scale north of Prince Albert is offering a good market to farmers settling in that country for the sale of hay, oats and all other products and provides also employment to thousands of men all the year round.

The completion of the Canadian Northern railway to the town last summer, and the proposal of the company to put a bridge across the river and build a branch line on the north side of the river to Battleford and Edmonton, together with its intention of connecting this town with Hudson Bay, has made the place boom and the price of town lots has risen accordingly to a high figure.

The building of these railway branches should attract the attention of intending settlers to this northern district.

During the course of the season I travelled several hundred miles across the different provinces and everywhere I noticed an activity unparalleled in the annals of the past. In the Edmonton district the country is filling up rapidly; this country is unexcelled for mixed farming, and there is still a large quantity of desirable land ready for settlement. I consider this district the ideal country for farmers from Ontario and Quebec who cannot make up their mind to settle in open country where wood cannot be found for miles around a home.

The File hills and Touchwood hills districts which have for so long been in the wilderness, are now becoming more and more settled every day. The construction of the Grand Trunk Pacific railway which was commenced last summer, brought in numerous settlers who make their new homes along the line.

At a short distance north of Touchwood Hills post office, there is a small settlement named Wishart, established several years ago on the western edge of Round plain. This is a very rich country; all the farmers are well off and carry on mixed farming with great success. Here I saw, at Mr. Michael Hall's, a pioneer of the place, the best fields of wheat that were grown in the west during last summer, but on the other hand, I was greatly disappointed to see the adjoining land, the Round plain, still mostly vacant, when thousands of bushels of fine wheat could be raised. This is due to speculators having acquired this land with scrip, and holding it at a high price. No better country could be desired for farmers who can afford to buy farms offering all advantages as to water and fuel supply in the immediate vicinity, and the prospect of fine crops.

From Round plain to Foam lake, settlers are now seen scattered all along the country where a few years ago there was hardly anybody and at Foam lake there is a very prosperous settlement of Icelanders.

The extension of the Canadian Pacific railway from Sheho towards Saskatoon and Edmonton was under construction last summer and runs at a short distance south of Foam lake, where a small town is already started at the crossing of the creek which empties into the lake; there are already two general stores under construction. The country offers great facilities for mixed farming owing to the large quantities of hay growing in the bed of the lake. This lake has been gradually drying for the past few years, and on that account I would respectfully suggest the resurvey of it and the extension of the subdivision lines therein for the benefit of the settlers who are desirous of taking up this land.

Leaving Foam lake, I passed through townships 32, ranges 9, 10 and 11, which are better adapted for stock-raising than agriculture, though some farms are seen here and there, principally in range 9, where the land is more rolling. The main line of

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the Canadian Northern railway runs through the southern part of township 83, range 9, where a station named Invermay is situated, around which a small village is springing up very rapidly in section 1. The inhabitants speak very highly of the prospects of the country.

From Invermay I journeyed via Theodore through a country fairly well settled and where good crops are seen increasing in quantity and quality as we reach Yorkton the pioneer town of the district.

From Yorkton, I journeyed via Saltcoats, Churchbridge and Wapella, to Wauchope, a station on the Arcola branch of the Canadian Pacific railway, enjoying the finest sight one could witness in the Northwest. The harvest was in full swing everywhere; the country resembled an immense sea of grain and I consider it an ideal paradise for those who prefer a prairie country.

On my way back I passed through Kamsack, following the road which branches off at the Roman Catholic mission on Kee-see-koose reserve towards Bearshead lake, which lake I had to traverse. This road passes through a Galician settlement situated on the western slope of Duck mountain. The country is burnt and overgrown with young poplar, but it is sufficiently open for stock raising. Several small creeks and lakelets are found along the route, where hay is plentiful. At Bearshead lake there is a small Swede settlement raising cattle and doing well, but there is plenty of room left for settlers, who may desire to go into that district.

In conclusion, I may say that all parts of the country which I visited during my trip are very desirable for settlers, according to their tastes; those who prefer prairie districts can find the same in the southern parts, and those who prefer wooded country or bluffs can find it in the northern portion. Game is abundant as in all parts of the Northwest, duck, geese, prairie fowl and deer being plentiful. No minerals were met with in the course of my travels.

On December 22, the snow being very deep, I decided to close my operations, and after making arrangements for wintering my outfit, I left for Ottawa, where I arrived in time for New Year's greetings.

I have the honour to be, sir,

Your obedient servant,

P. R. A. BELANGER, *D.L.S.*

APPENDIX No. 16.

REPORT OF LENNOX T. BRAY, *D.L.S.*

SURVEYS AND RESURVEYS IN SOUTHERN ALBERTA.

AMHERSTBURG, ONT., January 30, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on the various surveys made by me during the past season in the southwestern part of the province of Alberta.

In accordance with your instructions of April 23, I left in a few days following for Virden, Man., from which place I shipped the outfit I was to use during the season, to Macleod, Alberta. Here I met my men and proceeded to township 11, range 22, west of the 4th meridian, to investigate the necessity of a retracement and restoration survey which was reported needed.

After running the lines around this township and restoring all lost corners, I then found that the difficulty was in the east boundaries of sections 6 and 7. The

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monuments at the northeast corner of section 6 and on the east boundary of section 7 being out of place about ten chains, making the east boundary of the northeast quarter of section 6 long, and the east boundary of the northeast quarter of section 7 short by about the same amount.

As most of the quarter-sections governed by these monuments were homesteaded, I endeavoured to have the parties get together and sign a petition that would allow me to rectify these errors, but with no effect. I was therefore unable to make the corrections and reported the matter to you on June 3.

This township is open rolling prairie the soil varying from a sandy loam to a stiff clay.

Parts of sections 17, 18, 19 and 20 are broken by cut banks. Coal crops out along some of these cut-banks on section 18. This coal is used by some of the settlers but is of an inferior quality.

This township is nearly all settled up. On the completion of my work here, I proceeded to township 1, range 30, west of the 4th meridian and continued the survey of the Dominion lands from the northeast corner of section 32 along Oil creek through this township and township 1, range 1, west of the 5th meridian to the lake on the International boundary laying out as many sections and quarter sections adjoining the creek as was possible.

Oil creek valley being only from a quarter to about a half mile wide and bounded on both sides by high steep mountains, is timbered with thick young spruce and jack-pine, though open patches occur all through it.

Through section 30, township 1, range 30 and section 25, township 1, range 1 the valley widens some. The townsite of 'Oil City' is laid out on a part of each of these sections.

The Rocky Mountain Developing company are drilling for oil on section 30. They have one well completed from which they can pump a good quality of crude oil. Two other wells are being put down by them on this section.

The Pincher Creek Oil Company are drilling a well on the north half of section 25, township 1, range 1.

Spruce and pine timber measuring up to forty-eight inches in diameter was found on section 11, township 1, range 1, scattered throughout the central part of the section.

A good wagon road, though in places of a very steep grade, leads from 'Oil City' northeasterly to the prairie.

Oil prospectors who are drilling in Flathead valley are opening up a wagon road out of the valley which will pass through both of these townships and join with the one at 'Oil City.' I next continued the Dominion land surveys from the north boundary of section 7, township 2, range 30, west of the 4th meridian, westerly along Blakiston brook into township 2, range 1, west of the 5th meridian.

On section 13, township 2, range 1, west of the 5th meridian this brook forks, one branch running westerly north of Blakiston mountain and the other running westerly south of Blakiston mountain.

I laid out sections and quarter sections on the north branch as far as the northeast corner of the northwest quarter of section 20, and along the south branch as far as the northeast corner of section 8.

Both branches of Blakiston brook have narrow valleys which are bounded by high bare mountains on both sides.

Open areas occur all through the valleys separated by thick young spruce and jackpine, which also covers the mountain sides.

A block of spruce, pine and balsam timber of about five hundred acres measuring from ten to forty inches in diameter was passed through on the north boundaries of sections 20, 21 and 22. Another block of large timber was observed on the southern part of section 8. A pack trail follows each fork of Blakiston brook through the township. I then retraced and continued the survey of the 5th meridian from the northeast corner of section 24, township 4, range 1, to the northeast corner of township 3,

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range 1, and completed subdividing the remaining portion of township 4, range 30, west of the 4th meridian. This township is rolling land covered with thick willow and young poplar bluffs, with intervening patches of prairie which are about equal in area. It is well watered by springs and brooks running down from the mountains. The soil is a deep black loam, covered with a luxuriant growth of grass.

This township is well adapted for ranching, though considerable land has been broken in it and grain growing started.

Eight squatters' declarations were taken and there appear to be applicants for the remaining quarter sections.

My next work was in township 5, range 2, west of the 5th meridian, where I subdivided the northern two-thirds of the township. This township lies well up in the mountains and is rough and broken by high hills, which are covered with poplar, jack-pine and young spruce, more so on their northern slopes.

There are a number of open flats in the creek valleys, which are nearly all squatted on.

The soil of this township is a thin depth of loam underlaid in most cases by a gravel subsoil.

This township is well watered and adapted for ranching.

A seam of what appears to be good coal, crops out of the cut banks on section 25.

In this township fourteen squatters' declarations were taken.

In townships 6 and 7, range 3, west of the 5th meridian I completed the west outlines and subdivided sections 19, 30, 31 and 32 in township 6, and sections 5, 6, 7 and 8 in township 7. These sections all lie well up in the mountains and are very rough and broken. As a whole they are not at all suitable for any settlement. Though portions of these sections could be used for grazing, they are mostly covered with young pine and spruce.

Coal has been mined on the northeast quarter of section 31; at present, however, the mine is not being operated.

In township 9, range 3, west of the 5th meridian, I laid out sections 1, 2, 11 and 12. Most of the east halves of sections 1 and 12 and the southwest quarter of section 1 lie in a valley which is partly covered with scrub. The soil in this valley is good.

The south half and central northern part of section 2, and central part of section 11, are in a rolling valley which is covered alternately with patches of open prairie and willow and poplar scrub. The remaining parts of these sections are broken by high bare hills.

In township 8, range 3, I completed the survey of the east outline and the subdivision of the two eastern tiers of sections and the east boundaries of sections 4, 9 and 16. The two eastern tiers of sections lie mostly in a wide undulating valley and are covered alternately with patches of prairie and willow and poplar scrub.

These sections are well watered and are suitable for ranching.

Part of the Livingstone range of mountains covers sections 4, 9 and 16 and spurs run out from them a distance of a half mile or more, making the west halves of sections 3, 10 and 15 very rough and broken. The east halves of these sections are suitable for grazing.

Prospectors report having found a good quality of magnetic iron ore on sections 21 and 22.

West of the Livingstone range of mountains I continued the west outline southerly a distance of one mile to the northeast corner of section 12, township 8, range 4. Here owing to the inaccessibility of Goat mountain I ran an offset line southerly through the centres of sections 6 and 7. As the eastern boundaries of section 5, 8 and 17 run nearly along the summit of the Livingstone range of mountains, I was compelled to run an offset line northerly through the centres of sections 5, 8 and 17. These sections are very rough and broken by deep gulches and ravines.

The soil is gravelly and covered with young spruce and poplar scrub in patches.

Coal seems to be plentiful on these sections and is being mined on section 17.

Four squatters' declarations were taken in township 8 and one in township 9.

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In township 7, range 4, west of the 5th meridian, I ran out the north boundaries of section 26 and the south half of section 35 and the east boundary of the west half of section 35, and several other lines in the northeast quarter of section 35, south of the Crow's Nest branch of the Canadian Pacific railway, in connection with the claims of Messrs. Lyon, Pelletier and McKenzie. I then went to township 8, range 6, west of the 5th meridian, and ran the east boundary of section 2. Here after the continued snow storms which rendered work on the mountain sides dangerous and impossible I was compelled to give up the intention of subdividing any further in this locality, and I moved to township 3, range 30, west of the 4th meridian and laid out sections 13, 24, 25 and 36, which are rolling land covered alternately with patches of prairie and willow and poplar scrub, well watered, of excellent soil and suitable for ranching.

Closing up field operations on the completion of this work, I wintered my horses and stored my outfit at Twin Butte and arrived home on December 4th.

I have the honour to be, Sir,

Your obedient servant,

LENNOX T. BRAY, *D.L.S.*

APPENDIX No. 17.

REPORT OF P. A. CARSON, *D.L.S.*

TRIANGULATION SURVEYS IN THE RAILWAY BELT OF BRITISH COLUMBIA.

OTTAWA, January 4, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General, Ottawa.

SIR,—I have the honour to submit to you the following report of my field operations on the triangulation in British Columbia in connection with the Trigonometrical Section of the Topographical Survey of Canada, for the season of 1906, with an accompanying map.

I will quote, Sir, from your letter dated the 4th day of July, 1906, 'A surveyor should devote the greatest care to the preparation of his annual report, that being the only thing which parliament and the public have before them to form an opinion of the surveyor's efficiency.' It would seem, therefore, that the object of a surveyor's annual report is not so much to give to the department an exhaustive technical treatise on the surveyor's field operations as to present to the public at large a clear account of the work performed, and to impart such knowledge and information as the surveyor has gleaned while in the field.

How often during the past season was I asked by tourist, merchant, farmer, prospector, by every one I met that perpetual question 'What is your survey for?' To the average person the need of ordinary surveys for the subdivision of agricultural lands, or defining mineral claims, is at once apparent. But a triangulation survey of the mountains, well, to almost all, the necessity and object of such a survey are incomprehensible.

I would say, therefore, by way of explanation, that the object of this triangulation survey is a purely practical one, viz.: of providing by a system of triangulation a number of permanent reference marks available for the extension, over adjacent areas, of surveys of all kinds—the subdivision of agricultural lands, defining the limits and boundaries of the railway belt, mineral claims, timber limits, &c.,—which are so necessary to the development and administration of all new countries. On account of the mountainous nature of that vast tract of country lying in the

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embrace of the Rocky and Selkirk mountains, the surveys of British Columbia are necessarily of an isolated nature, in contrast with the gigantic system of surveys so admirably developed and extended in the comparatively level provinces of western Canada. The huge framework of the system could not be extended through the mountains, where it was impossible to run base lines. Consequently, to perform required surveys in isolated valleys it was often necessary to run slender and unreliable traverses over many weary and expensive miles. Such a method was of course objectionable, and the difficulty was solved by a triangulation survey which establishes convenient permanent reference points for commencing all kinds of new surveys, and besides forms a bond connecting the main system of Dominion surveys with its outlying parts, making the whole depend upon the same astronomic and geodetic data, and securing a uniformity and consistency for the entire system not otherwise obtainable.

The method of performing such a triangulation survey is as follows:—With the assistance of all existing maps and other information of the country to be embraced by the survey, a system of triangles is projected. The shape of the triangles is dependent only on the rule that no angle of a triangle should be greater than 120° or less than 30° ; the length of the sides of the triangles varies according to the nature of the country, the precision required, and the objects to be gained. In this survey the sides of the triangles are from fifteen to twenty miles in length. A reconnaissance party visits the projected stations, and decides upon their suitability, or chooses other nearby stations in their stead. In this the surveyor in charge of the reconnaissance is guided by many circumstances and conditions, such as: the existence of trails or other feasible routes by which the stations may be reached, the accessibility of the summits, the permanence and suitability of the peaks, (an ice-capped peak will not answer) the prominence of the neighbouring peaks and ranges, the intervisibility of the different stations, and so on; and upon his success in fixing these stations largely depends the ultimate success of the triangulation.

When the stations have been fixed and signals erected horizontal angles are carefully observed at each station. A base line is also located and accurately measured; then by gradually increasing triangles it is projected and extended to the main system. At certain stations astronomical observations for azimuth are taken, and the latitude and longitude also determined. By means of these data, viz.: the linear measurements of the base line, the angular measurements of the triangles carefully weighed and adjusted, and the determination of azimuth, latitude and longitude, there are then calculated the relative positions of all the triangulation stations, and other secondary reference points.

From observed and corrected vertical angles at the different stations may be determined the altitudes above sea-level of all stations, mountain peaks, and other reference points, using certain known altitudes such as the rail-levels of the Canadian Pacific railway as media of reference. Altitudes so calculated are more accurate than those obtained from unreliable and limited aneroid readings.

Each triangulation station on the summit or peak of a mountain is marked in a permanent manner. The permanent mark adopted for this survey consists of a brass bolt six inches long and three-quarters of an inch in diameter, with a flat square head one and one-half inches square and one-half inch thick. This bolt is set in a hole drilled in the rock and firmly fixed by cement. The head of the bolt is stamped with the number of the station in Roman numerals followed by the Greek letter Δ , or triangle; the apex of the triangle faces the north at the centre of the head of the bolt, and is the geodetic point. Besides its number, the station is generally given a name, such as the local name of the peak or range on which the station is situated.

As reference points for accurately determining the position of the permanent mark at any future time, are placed four separate iron bolts, set in holes drilled in the rock and fixed with cement. The bolts are each six feet distant from the geodetic point, and bear respectively north, south, east and west from it. This method of placing

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reference marks was followed as closely as circumstances would permit, and a detailed description of each station was taken and recorded.

Signals for observing upon from other stations were erected as follows: with the geodetic point exactly at the centre of its base a conical stone cairn was built, measuring from six to eight feet in diameter at the base, two feet in diameter at the top, and from six to ten feet high. Surmounting the cairn was placed a truncated cone of tin, two feet in diameter at the base, one foot at the top and two feet high. The top of the signal in each case is vertically above the geodetic point. The individual measurements of each signal were taken and recorded.

The triangulation of the Rocky mountains in the vicinity of the main line of the Canadian Pacific railway and its extension westward within the railway belt, British Columbia, was commenced by Mr. W. S. Drewry, D.L.S., who began operations in the spring of 1889, and carried on the work for four successive seasons. During this time signals were set and angles observed at eighteen stations of a primary system of simple triangles, extending from the fifth initial meridian westward to Mt. King, in township 27, range 19, west of the fifth meridian. The tract embraced by this network is some one hundred and ten miles in length and has an average breadth of twenty miles. For this triangulation a base line about one and one-half miles in length was measured near Cochrane, Alberta, and extended to the main triangulation. Mr. Drewry also established signals westward into the Selkirk range, but here the simple system of triangulation was enlarged, and a double chain of triangles carried across. Eight signals in all were placed, crossing the summit of the Selkirks and reaching as far westward as Twin Butte, ten miles east of Revelstoke. No angles, however, were observed west of Mt. King, and at none of the stations were permanent marks placed.

In the spring of 1893 Mr. Drewry began work on the Alaskan boundary for the British Columbian government, and about the same time a decreasing demand for lands within the railway belt, as well as in the whole of western Canada, resulted in an almost stagnant condition of Dominion surveys for several years, and of course a corresponding decrease in the government survey appropriation. The triangulation survey of the Rocky mountains was consequently discontinued, and remained in abeyance until the renewed activities of the past few years in mining and lumbering operations, and an influx of settlers in the many fertile agricultural and fruit growing valleys of British Columbia showed the necessity of recommencing the triangulation.

My instructions, dated June 2, 1906, read: 'You are to take up the work where it was left by Mr. Drewry, in 1892, as shown on the accompanying diagram, and to extend it westward. The main object of your work during the present season will be to establish permanent marks at the stations which are to be occupied, to erect signals for observing angles next season, and to select a place for measuring a base line. The latter should not be less than five miles.' I left Ottawa on June 5 for Calgary, where I outfitted for the field.

STATION XIV. (STORM MOUNT).

Storm mountain, on whose summit station xiv. is situated, was the first station visited, being on the western limit of the completed portion of the triangulation. It is a high mountain (alt. 10,300 feet) at the summit of the Rockies, on the boundary between the provinces of Alberta and British Columbia. The mountain lies in the southerly portion of township 26, range 15, west of the 5th meridian, and is visible from Castle Mountain railway station, being about six miles distant therefrom in a southwesterly direction. To reach Storm mountain we camped at Castle Mountain railway station, sixteen miles west of Banff, on the left bank of Bow river. There is a good camping ground with excellent pasturage for horses on the small flat between the railway and Castle mountain. By following the old tote road westerly up Bow river for nearly two miles, we discovered an easy ford over the river, which at this date, June 19, was still very low, owing to recent cool weather. The Vermilion trail was connected with at the ford, being about half a mile west of the mouth of

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Vermilion creek. The trail keeps to high ground on the west side of the creek and was in fairly good condition. There are several small lakes along Vermilion creek in one of which we made some fine catches of large Dolly Varden trout. Some good timber still exists along the trail although a great deal has been cut for railway ties. The trail follows the south fork of Vermilion creek to Vermilion pass, a distance of about eight miles from the railway. There are many westerners who still maintain that Vermilion pass offers a better, though longer route for a railway (via Castle mountain, Vermilion pass, Vermilion, Kootenay and Beaverfoot rivers) than the present line of the Canadian Pacific railway over Big Hill or Kicking Horse pass. The altitude of Castle mountain station is 4,660 feet, and that of the summit of Vermilion pass about 5,300 feet, or a difference in elevation of six hundred and forty feet in over seven miles. The grade on the western slope would be even less. The pass is fairly wide with no danger of rock or snowslides.

About half a mile south of the pass, the trail crosses a small stream forming the headwaters of Vermilion river, flowing southerly. Here we pitched camp with Storm mountain lying to the east. The ascent of Storm mountain was made up its south slope. We descended along Vermilion river by trail for one and a half miles to the mouth of a small mountain stream flowing from the south base of Storm mountain. We ascended the small valley of this creek, guided by an old blazed trail, till we reached timber line at the head of the stream. Then attacking the steep snow-covered south slope of the mountain we attained the broad summit of Storm mountain after a climb of five and a half hours. I will not attempt to describe the magnificent panorama which may be seen from this mountain, the ever changing lights and shadows rising and falling on the frowning peaks of rock and the cold bare fields of eternal snow, extending in every direction to the blue horizon. The summit of Storm mountain was covered with three feet of snow, and on the eastern ledge of the peak a huge snow cornice ten feet high hung over the precipice. Drewry's cairn, a silent monument to the sometime presence of man, was in good condition after its fifteen years of solitary vigil. The cairn was covered with snow and the rocks were frost bound, but after considerable prying we managed to reach the bottom of the monument. In a hole drilled in the rock at the true centre of the base of the old cairn was placed a brass bolt (for description see above) fixed in cement. The head of the bolt was stamped with the number of the station in Roman numerals, followed by a triangle with its apex at the centre of the head of the marker. The apex of the triangle is the geodetic point. As reference marks were set four separate iron spikes in the rock, and fixed with cement. Each reference mark is six feet from the geodetic point, and they bear respectively north, south, east, and west from it.

Over the permanent mark the conical stone cairn was rebuilt in the same position as before. The cairn measures eight feet in diameter at the base, two feet at the top, and is eight feet high. Surmounting the cairn a truncated cone of tin was placed. It was filled with stones and securely wired to the cairn. The top of the tin signal is ten feet vertically above the geodetic point.

The day of the ascent, June 23, was a clear summer day, and during our five hours stay on the summit our heads were hot and perspiring with the heat of the sun, while our feet were numb with cold. The thermometer registered 72° Fahr. on the summit at 2.30 p.m. The descent to camp was made in two hours and forty-five minutes by a series of rapid glissades, and hurried scrambles over scree and shale. The day after our climb we were attacked with snow blindness, having neglected to take snow glasses with us up the mountain, and the bright and sparkling sun wrought havoc with our eyes. Our faces too were frightfully sunburnt.

There is very little grass for horses in the vicinity of Vermilion pass, although our horses managed to find some pickings along the trail. Game is somewhat scarce, too, in this district, although we saw traces of bear, deer and marten. The trout fishing is excellent, rainbow or cut-throat trout (*Salmo mykiss*) and Dolly Varden trout

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(*Salvelinus malma*) being plentiful in the small lakes and streams, although the fish are such gluttons that to a true angler their capture seems like slaughter.

STATION XVIII.

From Castle mountain the horses were sent to Field, British Columbia, via the old Canadian Pacific Railway tote road over the summit of Kicking Horse pass. The road is in very bad shape, but the trip was made without difficulty. The rest of the outfit was shipped by rail.

To locate station xviii, Mr. Drewry travelled up Amiskwi river which flows into the Kicking Horse just below Emerald river, and in making the ascent of the mountain whereon he set the signal, he had, according to his report, 'a hard, rather dangerous climb.' I learned at Field that the trail up the Amiskwi had not been used for some time, and that station xviii (under which name, by the way, the mountain is locally known) could be much more easily reached via the Yoho valley. Following this advice, we travelled to Emerald lake by an excellent wagon road, a distance of seven miles. Then we followed a well cut trail along the north side of that beautiful lake leading up and over the Yoho pass to Yoho lake (or Summit lake) where the Canadian Alpine Club held its first annual camp this summer. We then followed the upper trail northerly up the Yoho, the trail being cut along the steep sides of Mt. Vice-President and Michael peak almost at timber line. From the high elevation of this trail may be seen some of the grandest scenery in the Rockies, Takakkaw falls, Daly glacier, Mt. Daly, Mt. Balfour and the beautiful Yoho valley. Skirting lake Duchesnay the trail strikes a tributary of Yoho river, and a branch trail turns to the left, and ascends Little Yoho river, passing the broad form of Whaleback mountain, the Habel glacier—with the Isolated peak rising from the ice and snow—and reaches almost to Kiwetinok pass. We pitched camp at an altitude of six thousand feet, beside the Little Yoho, a small mountain brook some fifteen feet wide, with station xviii bearing northwest about two miles. There is a little grass in the valley of the Little Yoho, but in making this trip it is wise to camp at Emerald lake as there is no horse pasturage at Yoho lake or along the upper trail.

The ascent to station xviii was an easy one with very little green timber or brush to retard progress, on account of the high elevation of our camp. Most of the trip was a steady ascent up huge snow-fields, and the summit was reached in three and one-half hours. The whole mountain was covered with deep snow, and a cornice rose on the easterly ledge of the peak to a height of twelve feet. A strong and bitterly cold wind blew all day and during our enforced stay on the summit we suffered horribly from cold, although the thermometer really registered only 20° below freezing point. The wind so shook the transit, too, that good instrumental work was impossible.

The view from station xviii is a grand one, especially over the enormous fields of ice and snow which extend far away to the north and east, the Wapta glacier and névé, the Habel glacier, and the Waputik snow field, and forever guarding the white landscape are the cold stern gendarmes, Mummery, Habel, Collie, Baker, Gordon and Balfour. To the south are the clustered peaks of Kerr, Marpole, President, Vice-President and Michael. In the southwest stretches the thin red line of the Van Horne range; and to the west, the dark green valleys and passes near the Blaeberry stretching northerly to Howse pass.

On the summit of the mountain we found Drewry's cairn in good condition, and at the centre of its base we set the brass permanent mark in a hole drilled in the rock, fixing it firmly with cement. The head of the brassmarker was stamped with the number of the station in Roman numerals, followed by a triangle with its apex at the centre of the square head of the bolt. The apex of the triangle is the geodetic point. Two reference points were placed, being iron bolts, each set in holes drilled in the rock, and fixed with cement. One reference bolt is due south of the geodetic point and is seven feet from it. The other reference bolt is due west of the geodetic

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point, and is six feet six inches from it. No other reference marks were placed owing to the deep snow on the north and east sides.

Over the permanent mark the conical stone cairn was rebuilt in exactly the same position as before. Its dimensions are: seven feet in diameter at the base, two feet at the top and seven feet high. Surmounting the cairn a tin signal was placed as at station xiv. The top of the signal is nine feet vertically above the geodetic point.

We returned to Field as we came, having been absent six days, during which time we had three days' rain with several inches of snow on the third day.

STATION XVII. (MT. KING.)

Station xvii is situated on the summit of Mt. King at the southerly end of Van Horne range. This range of mountains extends from Kicking Horse river near Ottertail in a northwesterly direction to the Blaeberry, and the red colour of the rock makes the range easily distinguishable from a distance. The station lies in the northwest quarter of section 29, township 27, range 19, west of the fifth meridian, and is distant about four miles in a northwest direction from Ottertail railway station.

The mountain is reached from Field by following the Ottertail wagon road down the south side of Kicking Horse river for three or three and one-half miles; then, near the railway siding of Emerald, and about three hundred yards east of a log house by the side of the wagon road, a trail turns off down into the Kicking Horse flats. This trail follows the river for about three miles when the stream may be easily forded. The trail then leads to some old logging shacks on Otterhead river. Another set of loggers' cabins is situated a mile and a half above the first group, and camp should be pitched midway between the two logging camps. There is plenty of grass for horses along the low flats near the mouth of Otterhead river. Some of the timber along this stream has been logged and run to Palliser, but there still remain good limits of spruce, fir and cedar, although nearly all the timber is under license. Moose, deer and bear are plentiful in this vicinity, and a few goat on the mountain.

Mt. King is not an easy mountain to approach as the timber at the base and on the lower slopes is full of windfall. The climb is made easier by following some of the loggers' trails which ascend for a short distance up the lower slopes. The best ascent from the east side is up the bed of a stream which flows into the Otterhead midway between the two groups of logging cabins. The best route then is to follow this draw to its basin, cross over a shoulder to the north, and descend into the basin of the largest creek (called locally Bear creek) which flows from Mt. King into the Otterhead. This basin is the objective point, but the ascent should not be assayed up Bear creek on account of the heavy growth of alder and brush lining that stream. Much arduous toil is saved by commencing the ascent at the proper point. On gaining the basin of Bear creek the remainder of the trip is up a steep arête, which makes an interesting climb. We made the ascent from our camp on the Otterhead in seven hours and a half taking things easy all the way.

We found Drewry's cairn on the summit which is about fifty feet long east and west, but only a narrow ledge of rock north and south, with a sheer drop of five hundred feet on the north side. The cairn was razed, and at the true centre of its base a brass marker was set in the solid rock and fixed with cement. The flat top of the marker was stamped with the number of that station xvii., in Roman numerals, followed by a triangle with its apex at the centre of the head of the marker. The apex of the triangle is the geodetic point. As reference marks three iron bolts were placed in holes drilled in the rock, and fixed with cement. Each bolt is six feet distant from the geodetic point, and they bear respectively south, east and west from it.

Over the permanent mark the conical stone cairn was rebuilt in the same position as before. It measures seven feet in diameter at the base, two feet at the top, and is six feet six inches high. Surmounting the cairn a tin signal was placed. The top of the signal is eight feet six inches vertically above the geodetic point.

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The ascent was made on July 4, and the day was bright and warm, with little or no wind. The thermometer registered 75° Fahr. on the summit at 3 p.m. The peak was covered with a lot of snow, and a huge cornice hung over the northerly ledge. The descent was made in four hours after a very disagreeable trip down the alder-tangled bed of Bear creek.

STATION XIX. (BLAEBERRY).

We next moved to Golden, a small lumber town, lying in the Columbia valley at the mouth of Kicking Horse river and then descended the Columbia valley about eight miles by wagon road to the flag station of Moberly.

Just west of Moberly siding there is a tract of land some eight hundred acres in extent, lying between the railway and Columbia river, part of which is muskeg and part good hay land, but mostly inundated at high water during July and August, and the greater portion of September. An optimistic outsider has purchased this land, and intends to attempt some extensive dyking and draining, although the neighbouring ranchers between Golden and Moberly cast doubt upon the feasibility of the scheme; they claim that it is impossible to drain off the abnormal seepage from the mountains as most of the land is lower than the bed of the Columbia. The enterprise should be watched with great interest, for on its success depends to a large degree the redemption of the extensive bottom-lands along Columbia river.

There are several prosperous ranchers between Golden and the Blaeberry, and excellent timber on the west side of the Columbia, some of which is being logged and run down to a sawmill at Beavermouth. There is a good site for a sawmill at the mouth of Blaeberry river, and the timber up that river is unexcelled in quality, fir, cedar and spruce growing thick, straight and sound, and of a convenient size for logging and driving. Most of the timber is on the east side of the river, that on the west side for a dozen miles being mostly burnt. The Blaeberry is a grand game district, moose, caribou, deer, bear and goat being plentiful, and at no distance from the railway.

Blaeberry river is a rapid glacial stream heading at the Howse pass. It has an average width of forty feet, and a depth of three feet, and runs nearly eight miles per hour. The valley is from half a mile to a mile in width, and in some places the river runs through gravel flats, although at about nine miles from the railway it emerges from a narrow canyon which extends for six or seven miles up the river. There is very little grass for pasturage after leaving the Columbia valley until this canyon is passed.

A good pack trail follows the east side of the Blaeberry from the Columbia, commencing just east of the Blaeberry railway bridge, although about half a mile west of Moberly, and a mile and a half east of the mouth of the Blaeberry, a trail turns off the old tote road and joins the main Blaeberry trail about three miles up the river. The mountain on which Mr. Drewry placed his cairn is on the west side of the river, and by the use of field-glasses the stone monument is visible from the trail. We ascended the Blaeberry about six miles, forded the stream at some shingle flats, and followed the west side of the river for about two miles and a half, cutting trail as we went. The ascent to the Blaeberry cairn was made via the southern slope of the mountain, up a wooded ridge covered with brulé and windfall, which made the trip to the timber line very fatiguing. Above the limit of vegetation the ascent was quite easy, and the broad summit of the mountain was gained after a six hours climb.

Station xix (Blaeberry) was marked with the usual brass marker, set flush in the rock, and fixed with cement. The head of the marker was stamped with the number of the triangulation station in Roman numerals, followed by a triangle with its apex at the centre of the head. The apex of the triangle is the geodetic point. As reference marks four several iron bolts were set in the rock, and fixed with cement. The bolts are each six feet from the geodetic point, and bear respectively north, south, east and west from it. Over the permanent mark a conical stone cairn was built, seven feet in diameter at the base, two feet at the top, and six feet high. Surmounting the cairn the usual tin signal was placed for observing upon. The top of the

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signal is eight feet vertically above the geodetic point. I afterwards discovered at some of the stations subsequently visited, that the Blaeberry signal is very hard to discern, and would perhaps be better situated on a more prominent mountain lying to the northeast of the station as at present located.

The descent from the mountain was made in three hours; we saw a herd of mountain goat which allowed us to approach to within fifty yards. During our six days sojourn in the Blaeberry country we had three days' rain. During the other three days the weather was extremely hot, and mosquitoes were somewhat troublesome.

STATION xx (BEAVERFOOT).

After returning to Golden, we journeyed up the Columbia valley by the Government wagon road, our objective point being a cairn on the Beaverfoot range in township 24, range 19, west of the fifth meridian. The Beaverfoot mountains lie between Columbia and Beaverfoot rivers, and extend from Kicking Horse river in a southeasterly direction. Between this range and the Dogtooth mountains on the west side of Columbia river, Columbia valley is low and flat and about two miles wide. The river is broad and slow of current, with numerous side channels, and during the greater part of the summer floods nearly all the low hay lands in the valley to a depth of three or four feet. When the water recedes in the autumn, the farmers cut a great abundance of slough hay from the wet meadows. This hay when left uncut and protected by snow affords good pasturage for horses and cattle all winter, but when cut, it dries very quickly, and even when mixed with salt does not contain much nutriment. On the uplands of the valley the soil is sandy and dry, even gravelly, and needs irrigating for which plenty of water may be obtained in the many streams flowing from the mountains. The timber is mostly small poplar and birch, which is easily cleared, although on the lower ridges of the mountains good fir is found, most of which is under license, and is at present being cut for railway ties. There are a number of good farms for seven miles above Golden, then six miles or so of poor land, when the farms recommence and extend for one hundred miles up the valley. None of the land on the west side of the valley is taken up, as there is no wagon road tapping it. The Kootenay Central railway a branch line of the Canadian Pacific railway which will connect Golden with the upper Kootenay and the Crowsnest, has ten miles of its line under construction, but from what information I could gather I fear the inhabitants of the valley will have to wait some years yet before the line is completed and trains running. A weekly stage runs from Golden to Windermere, and a large flat bottomed steamer navigates the sand bars of the river during the summer months between Golden, Spillimacheen and Windermere carrying freight, and passengers who are not in a hurry.

It seems to me that the fruit industry, especially the hardy fruits, might be developed in this part of the Columbia valley. The sandy soil is suitable for fruit growing, and the protection which Beaverfoot mountains afford from the early sun would prevent destruction from frosts. Already some of the more enterprising farmers have experimented with some of the hardy fruits, and although the trees are still young, they are healthy and vigorous and bear good showings of apples, crab apples and plums. The valley also produces an abundance of strawberries, gooseberries, red currants and black currants, besides ordinary garden produce. Wild strawberries, raspberries, blueberries and service berries also grow in profusion.

The west boundary of Yoho Park reserve runs between ranges 19 and 20, west of the fifth meridian, to the south limit of the railway belt. There is a strip of excellent farming land therefore lying within the park, which cuts the valley like a wedge. I would respectfully point out that if the western boundary of Yoho Park was here altered and made to run along the western base of the Beaverfoot range of mountains from township 25, range 20, to the south limit of the railway belt, instead of along the astronomic meridian at present forming the boundary, the objects for which the park

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was extended would not be affected, but rather assisted, and, moreover, a goodly strip of agricultural and fruit raising land thrown open to settlers.

Drewry's cairn on the Beaverfoot range was found by means of field glasses, and camp was pitched near the wagon road about twenty-nine miles from Golden, with the cairn bearing N. 30° E., and distant about three miles. On crossing the lower ridges of the mountain through heavy timber, the main slope was reached and an easy ascent accomplished up a rocky spur facing the Columbia. By following well beaten goat trails we soon gained the grassy meadows at timber line and attained the summit of the mountain (alt. about 8,700 feet). While on the mountain we saw nearly thirty mountain goats, some of which were very shy, while others allowed approach to within fifty feet and moved away only when we hurled stones at them.

Station **xx** was marked with the orthodox brass bolt set flush in the solid rock and fixed with cement. The flat head of the marker was stamped with the number of the triangulation station in Roman numerals, followed by a triangle with its apex at the centre of the head of the marker. The apex of the triangle is the geodetic point. For reference marks four several iron bolts were cemented in holes drilled in the rock. The bolts are each six feet from the geodetic point, and bear respectively north, south, east and west from it.

Over the permanent mark a conical stone cairn was built, six feet in diameter at the base, two feet at the top and seven feet high. Surmounting the cairn the customary tin signal was placed. The top of the signal is nine feet vertically above the geodetic point. The summit of the mountain on which the station is situated is a long narrow one extending in the southeasterly direction of the range, and consists of three conjoined peaks. The rock at the summit is composed mostly of gray syenite-gneiss, and in consequence of the gray colour of the cairn this station is not readily discerned from a distance, especially from the direction of Spillimacheen. Subsequently I clothed the cairn with a mantle of white paint.

STATION XXI. (SPILLIMACHEEN).

From our camp near the Beaverfoot triangulation station we returned to Carbonate Landing, seventeen miles from Golden. Here Columbia river was crossed to the west side by means of a row boat, the horses swimming the main channel. At this season of the year, July 21st, the river was very high, and covered the bottom lands of the valley, narrow fringes of cottonwood and willow alone breaking the broad expanse of water. Carbonate landing some years ago was the lively gateway to the Spillimacheen, McMurdo and Lardo mines, but operations in these mining districts are now suspended, the landing is deserted, the ferry has disappeared, and the old hotel on the west bank of the river habited only by porcupines and pack-rats. Gold-bearing quartz has been discovered up the Spillimacheen, but not of a high grade, also argentiferous galena and copper pyrites in sufficient quantities to merit development if good shipping facilities could be obtained.

A good pack trail leads from Carbonate landing to a low pass at the southerly end of the Dogtooth mountains, a distance of five miles. Here the trail forks, the left branch descending to the middle and south forks of Spillimacheen river, and the right branch of the trail dropping gradually for about one thousand feet to Loon lake, a distance of four and one-half miles. This branch of the trail follows the left bank of the north fork of the Spillimacheen for about thirty miles to the pass at the heads of the north fork and Grizzly creek, where it connects with Grizzly trail, and finally emerges at the railway at Bear creek station.

For about twenty-five miles from the mouth of Spillimacheen river, which empties into the Columbia some forty miles above Golden, the Spillimacheen valley is very broad with low timbered ridges and hills holding excellent timber, some of which is now being logged. Farther up the valley the several forks and smaller confluent of the river are separated by high ranges of mountains pointing down the valley like huge inverted wedges. Here the timber is of less value.

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The valley of the north fork is separated from Canyon creek on the north by a range of mountains from seven thousand to eight thousand feet high. Between the north and middle forks the watershed is low for about thirty miles from the Columbia, when the mountains increase in height, rising to an altitude of eight thousand to nine thousand feet. On the first bald mountain of this range lying between the north and middle forks, triangulation station No. xxi. (Spillimacheen) is situated, the cairn lying in the southeast quarter of section 25, township 24, range 22, west of the fifth meridian. The station may be reached from either the middle fork or north fork trail. We ascended to the cairn from a point on the north fork trail about seventeen miles from Carbonate landing, and were obliged to cross the north fork by means of a small raft, for although the stream is only some thirty feet wide, and three feet deep, the rapid current rendered fording impossible without a generous soaking. The ascent to the cairn was a comparatively easy one, being made up a rock slide on the north side of the mountain, and was accomplished in less than four hours (alt. 8,500 feet).

At station xxi. the customary brass marker was set and cemented in the rock, and stamped with the number of the triangulation station in Roman numerals, followed by a triangle with its apex at the centre of the head of the bolt. The apex of the triangle is the geodetic point. For reference marks four several iron bolts were set in the rock and firmly cemented. The bolts are each six feet from the geodetic point, and bear respectively north, south, east and west from it. Over the permanent mark a conical stone cairn was built, measuring six feet in diameter at the base, two feet at the top, and six feet six inches high. Surmounting the cairn the usual tin signal was placed. The top of the signal is eight feet six inches vertically above the geodetic point.

STATION XXII. (NORTH FORK).

We continued up the North Fork trail, which was in bad condition with windfall, necessitating a great deal of chopping of dry logs, and progress was therefore rather slow. At about twenty-three miles from Carbonate a pack trail turns off to the left up McMurdo creek, a tributary of the north fork of the Spillimacheen, flowing from the south through a narrow gap in the mountains. Ten miles farther on, the trail and the valley bend northerly, with Bald mountain on the west, a prairie-like hill some 7,500 feet in height, dividing the north fork from Beaver river, and extending nine or ten miles to the north as far as Grizzly creek summit; while on our right hand as we advanced up the valley, lay the large mountain on which Mr. Drewry's 'North Fork' cairn was situated. Along the north base of this mountain flows Baird brook, a glacial stream fifteen feet wide, entering the north fork about five miles from Grizzly creek pass. From this brook, which is somewhat larger than the north fork, the latter stream takes its milky colour. We camped at the junction of the two streams, at an altitude of 5,800 feet.

There are a few patches of grass along the north fork which serve as pasture for packhorses, and camping grounds must depend on these. The soil is mostly sandy and covered with jackpine. Game is scarce all through the valley except for a few grouse. On Bald mountain, however, caribou are plentiful, and smaller game as well.

The ascent to the sharp peak of station xxii. is an easy one—the best route being up Board brook for about a mile and a half to a large slide on the north side of the mountain, where a gradual slope leads to the summit (alt. 9,000 feet). The orthodox brass marker was cemented in a hole drilled in the rock. The bolt was stamped with the number of the station in Roman numerals, followed by a triangle with its apex at the centre of the head. The apex of the triangle is the geodetic point. For reference marks were placed four several iron bolts cemented in in holes drilled in the rock. The bolts are each six feet from the geodetic point, and bear respectively north, south, east and west from it. A conical stone cairn was built over the permanent mark. It measures six feet in diameter at the base, two feet at the top,

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and is six feet high. Surmounting the cairn the usual tin signal was placed. The top of the signal is eight feet vertically above the geodetic point.

The view from the sharp peak on which station xxii. is situated in an exceptionally grand one, the many ranges of mountains to the north and east appearing low and scattered in contrast with the awe-inspiring black mountains and white glaciers—the monarchs of the Selkirks—which tower above the plateau-like Bald mountain in the west. The grandeur of Mount Sir Donald as seen from the many view points along the Canadian Pacific railway has been extolled by mountaineer and tourist, but to really appreciate its massive beauty one must gaze with cold dread upon its eastern form. Cold and bleak the dark mass rises almost precipitously from Beaver river, while clustered about stand Mts. Macdonald, Avalanche, Uto, Eagle, Macoun, Donkin, Bonney, Dawson, Kilpatrick, and Wheeler, in dark contrast to the dazzling blue and white of countless glaciers, and the clear outline of the trackless Deville and Illecillewaet névés.

The great precipitation of snow and rain which falls in Spillimacheen valley, and the cold wave which nightly visits that district are doubtless caused by those immense fields of snow and rivers of ice, and the giant peaks which pierce the clouds. Our work in the Spillimacheen was greatly retarded by rain and snowstorms. We lost several days at Station xxi., and were forced to make ascents to Station xxii. At the latter cairn we were twice caught in a snowstorm which rendered it dangerous as well as disagreeable on the mountain top.

On leaving our camp near Station xxii. we advanced five miles up the North Fork trail to the low grassy summit of Grizzly creek, (alt. 6,700 feet) where the waters of the north fork and the west branch of Grizzly creek head not more than twenty-five yards apart. The summit of the pass is covered with luxuriant grass affording excellent pasturage for horses, while the bright gay colours of the many species of mountain wild flowers added greatly to the beauty of the spot. The Grizzly trail had not been travelled by horses for several years, and was littered with fallen trees most of which had to be cut out, as the trail runs along the steep mountain side so that there was no getting around obstacles which barred our passage. The trail follows the left side of the west branch of Grizzly creek high up on the hillside, but gradually descends until at about nine miles from the pass the level of the main creek is reached. Here we were obliged to ford the stream as the old bridge had been washed away by the tempestuous glacial creek. The trail then follows the right bank of the stream westerly for two miles, when a branch trail turns off to the south, crosses the Grizzly, and ascends Beaver valley. The main trail here swings to the north and descends the right or east side of Beaver river for two and one-half miles where it crosses the rapid stream by a new bridge. Then descending along the left bank for half a mile it crosses the mouth of Bear creek and commences to ascend the mountain side to quickly emerge at Bear Creek railway station.

From Bear Creek there is no trail or tote road either up or down the railway, although there is not much trouble in taking horses up the track to Rogers pass, six miles away, and from there to Glacier. Northerly from Bear Creek it is impracticable to conduct horses on account of the high bridges by which the railway crosses the many turbulent mountain streams running through deep canyons.

STATION XXIII. (BEAVERMOUTH.)

The next triangulation station visited was 'Beavermouth' cairn which is reached from the railway station of that name. Beavermouth is a small lumbering hamlet lying in Columbia valley where Beaver river enters the Columbia just as the latter turns northward to the Big Bend. The valley near Beavermouth is rather narrow, the river flowing close to the base of a mountain on the north side so that the only bottom lands are on the south side of the river. These bottom lands are low and marshy and are superb breeding places for myriads of mosquitoes, which made our lives miserable during our sojourn in this vicinity in the early part of August. Never

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have I suffered so much from the onslaughts of these female pests, not even among the sloughs on the British Columbian coast nor in the muskegs of Alberta. And for many a day I shall vividly recollect the frantic time we spent at Beavermouth endeavouring to snatch a few mouthfuls of food under our veils, and attempting to woo Morpheus with our lungs full of smoke from smudge-fires.

At Beavermouth there is a sawmill which is in operation most of the season, with a dozen to twenty houses for the mill hands, but there is no store or hotel. Quartz creek flows into the Columbia here from the south, but the old trail up the creek has not been used for many years and is now impassable for horses, as the auriferous quartz found up the creek did not turn out to be sufficiently rich to pay. There is good timber both up and down the Columbia, up Beaver valley, and on the lower slopes of all the mountains. Game is fairly plentiful in this vicinity, there being many bear in Beaver valley and deer in the mountains.

Immediately south of Beavermouth, and on the most northerly mountain of a low range lying between Quartz creek and Beaver river lay Drewry's cairn, to reach which we had to make a long and wearisome ascent of 4,500 feet through timber, brush and berry bushes and for a distance of over four miles before reaching timber-line; and I invoked blessings on Mr. Drewry for blazing the route through the dense timber. Although the station is situated on a very low mountain, at an altitude of only 7,250 feet, it is admirably located for the purposes of triangulation, as there are no mountains obstructing the line of sight towards 'Blaeberry,' 'North Fork,' and 'Bonney' and an uninterrupted view is obtained up the valley of Mountain creek, which solved the difficulty of carrying the triangulation across the summit of the Selkirks.

Station xxiii was marked with the customary brass bolt cemented in a hole drilled in the rock. The bolt was stamped with the number of the triangulation station in Roman numerals, followed by a triangle having its apex at the centre of the head of the bolt. The apex of the triangle is the geodetic point. For reference points were placed four several iron bolts cemented in holes drilled in the rock. The bolts are each six feet from the geodetic point, and bear respectively north, south, east and west from it.

Surmounting the permanent mark a conical stone cairn was built, seven feet in diameter at the base, two feet at the top and eight feet high. The usual tin signal was placed over the cairn. The top of the signal is ten feet vertically above the geodetic point. The summit of the mountain is low and broad, and to make the signal easily discernible from a distance the cairn was painted white.

STATION XXV (MT. BONNEY).

From Beavermouth we journeyed by rail to Glacier, where I made enquiries from the Swiss guides employed by the Canadian Pacific Railway company as to the best route for ascending Mt. Bonney, for I had come to the conclusion that a triangulation station on that lofty mountain was almost a necessity. From Edouard Feuz the veteran Swiss mountaineer, who already has had a wide experience amongst the Selkirks I learned that the only ascents of Mount Bonney which have been accomplished were made either via Loop creek and Mount Green, or by way of the Asulkan pass and Mount Swanzy; yet he was firmly of the conviction that the best ascent of Mount Bonney was to be made from the south side and would prove a most interesting climb. As it was necessary for me to ascend Flat creek pass, which lies south of Mount Bonney, in order to make an official visit to the hitherto invisible cairn 'Incomappleux,' as well as to reach Battle Creek cairn, I decided to follow the guide's advice. Consequently we left Glacier for Flat Creek siding, a distance of nine miles by trail. From Glacier a trail leads down past the great Loop to near Cougar creek, this trail having been recently cut out by the Canadian Pacific Railway company in order to reach the wonderful caves near Cougar creek. The last few miles to Flat Creek siding had to be made along the railway track, and I might remark, by way of parenthesis, that one of the most unpleasant duties of the season's work was driving impish pack horses

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along the railway track. Between Donald and Revelstoke there is no trail or tote road, and to go from one intermediate point to another it is necessary either to ship by rail, or to 'count the ties.' And a day's journey with pack horses along the railway track, with incessant dodging into narrow ditches to escape destruction from unexpected trains, well, the trials of such a day were enough to tax the temper of a saint.

Flat creek, a mountain stream about fifteen feet wide, flows into Illecillewaet river from the south almost opposite Caribou creek. A good trail follows the east side of this creek in a southerly direction for five and one-half miles to the summit. The first three miles is through good heavy timber, but as the summit is neared the valley is comparatively open. Slick creek also heads at the pass and flows in a southeasterly direction for three and one-half miles into Incomappleux river. Flat creek pass has an altitude of four thousand nine hundred and fifty feet, is about a half mile wide, and covered with luxuriant grass. Mountains rise on the east and west sides about 3,300 feet above the pass, and their lower slopes are covered with heavy green timber. Berries grow along the pass and lower slopes of the mountains in great abundance, and from the middle to the end of August attain perfection. Red raspberries, wild gooseberries, black currants and blueberries are plentiful, a delicious large black species of huckleberry (*Vaccinium Myrtilloides*) being most abundant.

We found the Incomappleux cairn on the mountain to the east of the pass, and it was undoubtedly evident that the cairn could not be used for a triangulation station as neither 'Beavermouth' nor 'North Fork' cairn was visible therefrom.

As Mount Bonney has been ascended on only a very few occasions and is considered one of the worthy climbs in the Selkirks it may perhaps be interesting to describe this first ascent from the south side. Leaving our camp on Flat Creek pass we took a small silk tent, blankets, food for three days, and a few cooking utensils besides our usual load of a transit, camera, tripod, brass marker, reference bolts, drill, drilling hammer, cement, tin signal, wire, &c., which made good packs for the three of us. On account of the high altitude of our starting point we were soon out of the dense timber and brush and in two hours and a half after leaving camp we reached timber line of the mountain lying east of the pass. From this elevation we could see the huge form of Mount Bonney lying about four miles away in a northeasterly direction. The three conjoined peaks just emerged from the immense glacier and névé which covered the whole face of the mountain, except where a long ridge or arête extended from the easterly end of the summit and sloped gently down in a southerly direction towards Incomappleux river, separating Bonney névé from Clarke glacier. This arête seemed to be the objective point for our ascent. We crossed the small snowfield which lay on the western slope of the mountain on which we stood, and dropped over the northeasterly side of the mountain, down a glacier and couloir, which led us past precipitous rock faces over tumbled masses of fallen rock across a wonderful quarry of creamy pink marble, down into a beautiful alpine meadow. Through the pale grasses of this meadow we advanced northeasterly for a mile. We met a herd of mountain goats in the meadow, but our arrival and strange appearance did not seem to disturb these phlegmatic animals for they merely stopped feeding as we approached, and watched us with a passive interest; and not until we were within a hundred feet did they decide to depart then quietly turned about and walked slowly away some of them even grazing and cropping as they went.

As we neared the main base of Mount Bonney our progress was stopped by a deep gulch through which ran a stream heading from the glacier on the south side of the mountain, and flowing in a southerly direction being part of the headwaters of the Incomappleux. It was now two o'clock in the afternoon so we decided to camp in the alpine meadow we had just crossed. We took off our packs, and pitched our tents beside a small trickling brook, and in the shelter of a group of stunted fir. Soon we had a roaring log fire ablaze and its warmth was greatly appreciated as the air grew quite chilly at this high altitude (7,000 feet) as soon as the early sun disappeared behind the western peaks.

Leaving our little camp in the meadow at six a.m. (August 22nd), we followed the edge of the deep gulch separating us from Mt. Bonney, until we gained the head of

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the stream at the tongue of the glacier. Crossing the stream we skirted back on the left or east side of the gulch for half a mile, when we commenced the rocky ascent of the ridge where we had decided the easiest ascent was to be found. On this mountain, as indeed in all our climbs, we failed to show the true mountaineering spirit, which, I am told, has a penchant for seeking the most difficult routes of ascent; instead, we always carefully searched for the safest and easiest route. After ascending some twelve hundred feet we reached the edge of the arête between Bonney névé and Clarke glacier. We then struck northerly along the narrow ridge of rock, and when possible walked briskly on the crisp snow of the sloping névé. After a steady pull of two hours and a half (the whole ascent from our flying camp occupying five hours) we reached the summit of Mt. Bonney (altitude 10,205 feet), and such a view! Fields of snow and rivers of ice, some of the largest névés known to man, extended to the north, the east and the south. Illecillewaet, Deville, Van Horne and Bonney névés, and the mighty glaciers below these tracts of snow. The highest peaks of the Selkirks clustered around—Duncan, Purity, Wheeler, Dawson, Fox and Sir Donald. To the north was the Hermit range, with the Swiss peaks and the Camels. Far away to the northwest stood a heterogeneous mass of snowy mountains, yet unnamed and yet unwon. Like mere plateaus in the undulating valley appeared Mts. Afton and Abbott, those worthy climbs from Glacier House. Five hundred feet below our feet over the precipitous northern ledge of the summit lay Bonney glacier, from which flowed a small creek towards and under the great loop of the railway whose snake-like form we could discern in the distance. The summit of Mt. Bonney extends for two hundred feet east and west, but it is a mere ledge of rock north and south. It is composed of three united peaks of almost equal height, the middle one, however, having the advantage by a few feet.

Station xxv. is situated on the summit of Mt. Bonney, in the Selkirk range, at an altitude of 10,205 feet. It lies in section 10, township 26, range 26, west of the fifth meridian. The station is marked by the customary brass bolt set and cemented in a hole drilled in the rock. The head of the marker is stamped with the number of the triangulation station in Roman numerals, followed by a triangle with its apex at the centre of the head of the bolt. The apex of the triangle is the geodetic point. For reference marks were placed two iron bolts set and cemented in holes drilled in the rock. The bolts are each six feet from the geodetic point, and bear respectively north and east from it. Two other reference points were also marked at this station, being crosses cut in the rock; the centre of each cross is six feet from the geodetic point, and they bear respectively south and west from it. Over the permanent mark a conical stone cairn was built, six feet in diameter at the base, two feet at the top, and six feet six inches high. Surmounting the cairn the customary tin signal was placed. The top of the signal is eight feet six inches vertically above the geodetic point.

The day of the ascent was fine and warm, with very little wind. The thermometer registered 97° Fahr. at the summit at 2 p.m. The descent to our flying camp in the Alpine meadow was made in three hours, and thence to the main camp in Flat Creek pass in four hours.

From Flat Creek pass we set out for Battle Creek to seek the cairn set by Mr. Drewry in the vicinity of that creek, although I had been unable to discover it from any station already occupied. The trail followed the west side of Slick creek, and about two and a half miles from the pass Jeopardy slide was met, which the trail crossed and descended by many switch-backs cut in the steep slide overgrown with alder, devil's club and other brush. At the slide a branch trail turned off to the right leading up to some mining claims which are being developed near the head of Bain brook. At these claims, and some on Incomappleux river, a high grade argentiferous galena ore is found, and these mines should prove to be paying propositions in the near future.

At about four and one-half miles from the pass the bed of Incomappleux river was gained, the river here flowing through gravel flats about fifty yards wide. The

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trail crossed the mouth of Bain brook, and followed the west shore of the Incomappleux for one and one-half miles to a narrow gorge in the river, where some old stringers showed us that a bridge had once spanned the stream. As it was impossible to cross the rushing river at this point, we retraced our steps half a mile, and forded the stream at the shingle flats. The trail ran along the east side of the river, crossing the broad slides where huge avalanches had carried away every vestige of green timber. These slides were overgrown with a rank entanglement of alder thicket, devil's club, nettles and brush, growing over five feet high, through which search for the trail was a trying task. After six miles of the most disagreeable travelling we had experienced all summer we reached Battle creek, thirteen miles from Flat Creek pass. Battle creek is a large tributary of Incomappleux river, flowing into it from the east; it rises from several large glaciers near the head of Beaver and Duncan rivers, and is a rapid stream some twenty-five feet wide, flowing mostly through rocky canyons. The bridge over Battle creek was gone, and we set our main camp on the north side of the creek near the trail. Some grass for horses may be found on the slides along a great part of the trail; and several small meadows along the Incomappleux, just below Battle creek, afford good pasturage for horses. These meadows are the haunts of herds of caribou and elk. Bears, too, are plentiful throughout the valleys of the last mentioned streams, especially in the month of August, when the many species of berries are ripe. There is some good timber along the Incomappleux, which it might be possible to drive to the Arrow lakes, in spite of the rapids and falls in the river. There is one fall of fifty feet on the Incomappleux about three-quarters of a mile above Battle creek. I saw some enormous cedar trees in the Incomappleux valley fully ten feet in diameter, but they were mostly rotten at the centre.

After making a tentative ascent of a mountain near our main camp at Battle creek, we took packs on our backs and went up the left side of the creek through very rough country. About three miles from the mouth of the stream we ascended to the timber line of a range of mountains lying south of the creek, called Battle range. From the peak of one of these mountains I searched in vain for Mr. Drewry's cairn, which he placed in this vicinity. Every mountain for miles around I swept with telescope and field-glasses, and soon came to the conclusion that the cairn no longer existed. An enormous mass of tumbled rock showed where a high peak had once stood, but now lay scattered and fallen on the neighbouring slopes. I placed a reference cairn on a high mountain to the east, but as neither station xxi nor xxii was visible therefrom, no permanent mark was set. I was unable to locate any of the peaks I had seen from 'Spillimacheen' and 'North Fork' cairns, but am of the conviction that a satisfactory location of station xxiv can be found near the heads of Beaver and Duncan rivers. On giving up the hope that anything further could be accomplished in the vicinity of Battle creek, we returned to Flat creek siding, whence the horses were sent to Albert Canyon along the railway track. From Albert Canyon, a wagon road follows the north fork of Illecillewaet river for twenty-nine miles, to the summit of the north fork and Downie creek, where the Waverley and Tangier mines are located. The wagon road was built at great expense by the provincial government to encourage the development of the mines, but after a considerable sum of money had been spent by the English syndicate which had bought the Waverley mine, and after gross mismanagement, and even misappropriation of funds, if we are to believe the tales that are told, the mine was closed without shipping any ore. The Lanark mines at Laurie, a pretty little mining town between Flat creek and Albert canyon, have a somewhat similar history. By sad experience it has been learned that Canadian mines cannot be successfully operated from Piccadilly, and the present dormant condition of British Columbia mining is the sorrowful result. I understand, however, that the Waverley, Tangier and Lanark properties are all considered good propositions, and I saw excellent specimens of argentiferous galena from these and other mines, on the north fork of the Illecillewaet, Corbin pass, Bain brook and the Incomappleux. The impetus given to British Columbia mining during the last year especially in Rossland and the lower Kootenays, leads me to believe that the next few years will see renewed ac-

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tivity all through the province, although it is difficult to conjecture just what effect the present boom in Cobalt will have on British Columbia. Will the much-needed capital be diverted to the wonderful silver district in northern Ontario, or rather will not confidence be awakened in all Canadian mining?

STATION XXVI (ILLECILLEWAET).

The Illecillewaet valley at Albert Canyon railway station is about half a mile wide, and there are here a couple of prosperous farms. A mineral spring with water of tepid temperature, gushes from the base of a mountain quite close to the village. The wagon road leading up the north fork of the Illecillewaet crosses the main branch of the Illecillewaet, about one and one-half miles from the railway, by a wooden bridge, then swings to the left towards the north fork, whose mouth is one-half mile below the bridge. The road then follows the east side of the north fork for about three miles, crosses the stream by another bridge, and continues up the west side of the river for five miles through some excellent stretches of spruce, hemlock, cedar and fir. In several places gumbo slides had cut away the road and we had to hack out a trail with mattocks. At about nine miles from the railway the road again crosses the river, at a breakdown log stopping house, locally known as 'Klondike,' and from here to the summit the road follows the east side of the stream. The north fork is a rapid glacial stream from twenty to fifty feet wide, with an average depth of three feet. In its lower waters small trout abound. The valley is comparatively narrow with good timber on both sides. The mountains guarding the west are stern and forbidding, rising about nine thousand feet high, and mostly laden with snow. Those on the east have a gentler appearance from the valley, except the snow-capped Corbin peak, and in many green meadows near the timber-line herds of caribou range. Bear, too, are plentiful, and cougar have been seen.

At about six miles from 'Klondike' we arrived at another log stopping place called 'The Farm.' Here we camped to spy out the mountains, and after some tentative climbs on neighbouring peaks in order to locate a satisfactory station, I decided on a mountain lying N. 30° E., from the old hotel. After an easy ascent to the summit, I placed station xxvi. (Illecillewaet) with the usual brass marker set and cemented in the rock. The marker was stamped with the number of the station in Roman numerals, followed by a triangle with its apex at the centre of the head of the bolt. The apex of the triangle is the geodetic point. For reference marks were set and cemented in the rock four several iron bolts. The bolts are each six feet from the geodetic point, and bear respectively north, south, east and west from it. Over the permanent mark was built a conical stone cairn, six feet in diameter at the base, two feet at the top and six feet high. Surmounting the cairn the usual tin signal was placed, and the cairn draped with white cotton. The top of the signal is eight feet vertically above the geodetic point.

During our stay up the valley of the north fork we were troubled with incessant rains, and fresh snow on the mountains.

STATION XXVII. (ALBERT).

Returning to Albert Canyon we moved by pack horses down the railway track a distance of ten miles to Twin Butte bridge, where by a bridge sixty-five feet high the railway crosses the small twin creeks flowing from the south into the Illecillewaet. There was no horse feed in this vicinity, so I sent the horses back to Albert Canyon in care of two men. We ascended a mountain lying in the northeasterly bend of Twin creek east, and found Drewry's cairn on a spur of the mountain along whose base the railway runs. I set a cairn and signal for station xxvii on a higher peak to the east, but did not place a permanent mark, as the final position of this station depends on the alteration of station xxiv, as well as on the yet unlocated stations westwards towards Revelstoke. While on the mountain setting this station, we were caught in a

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snowstorm which kept us up above for two days, during which time we suffered considerably from the wet and cold. The descent of the mountain through the fresh deep snow was extremely disagreeable and trying especially as we were encumbered with heavy packs.

From our experience on the west slope of the Selkirks I should say that the early part of the season is the only time of the year to accomplish satisfactory triangulation work in this district, for the precipitation here from the moisture-laden winds from the Pacific is enormous, especially during the month of September.

BASE LINE.

As it was now about October 1, and the season for mountain work pretty well advanced, I decided to return to the Columbia valley to attend to the important work of selecting a place for measuring a base line, which according to my instructions 'should not be less than five miles.' From what I had seen of the mountainous country between Revelstoke and the eastern slope of the Rockies, I was fully aware that it would be no easy task to find a stretch of country which would give a straight line five miles in length whose extent would be comparatively level and unbroken by wide channels or marshes. With the base line in view all season, I had carefully looked over all the country through which we passed, and had decided that the only available solution was to be found in the Columbia valley between Donald and the south limit of the railway belt, a distance of some fifty miles. I hoped to obtain a dry level stretch of five miles along the bottom lands of Columbia river, for I had been assured that all the sloughs would dry out in the fall. Dry out they did, sufficiently to allow the farmers to cut slough hay along the edges, but it was a different proposition when it came to lay out a Euclidian line five miles in length. The presence of bullrushes and marsh grasses, the muskrat domes, and flocks of wild ducks and geese were indisputable evidence that the water would remain until the frost and snow came. However the familiarity I had gained with the country, assisted by maps and previous surveys at length enabled me to locate a satisfactory line along the edges of the bottom lands of the Columbia about twenty-one miles above the town of Golden. The base line as established measures approximately 427.88 chains, chained with a steel tape; the line lies along the right shore of Columbia river near the wagon road, in townships 24, ranges 19 and 20, west of the fifth meridian. It runs mostly through small poplar and birch with occasional patches of spruce and fir. The mountains on each side of the valley are exceptionally suitable for extending the base to the main triangulation by three or four intermediate stations. Temporary marks and signals were erected on the base in preparation for linear and angular measurements next season.

STATION XXVII. (ALBERT).

The survey season for mountain work is very short, extending from the first or second week in June until the middle of October, for after the latter date the fresh snow which nightly falls on the mountains renders distant signals invisible besides making climbing disagreeable and dangerous. During the season the work of the survey is greatly retarded by rains and cloudy weather, and when much travelling is done it is rather difficult to make good use of such fine days as are suitable for climbing and observing. During the latter half of the month of June, near the summit of the Rockies, it rained seven days. In July, while we were in Columbia valley, and up the north fork of the Spillimacheen, it rained twelve days. In August at Beaver-mouth, Incomappleux and Flat creeks, we had beautiful weather, with only eight days rain. But in September, on the western slope of the Selkirks we had only ten fine days all month. In the Columbia valley during the month of October, we had twelve days on which it rained, eight days were more or less cloudy and unsuitable for mountain work while the remaining eleven days were fine and clear.

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Dense smoke, filling the valleys and obscuring the mountain peaks also seriously retards the work of mountain surveys, for a short period every summer. While we were at Beavermouth during the first week in August the thick smoky haze which we first noticed at Bear creek grew rapidly worse, and soon filled the Columbia and Beaver valleys, obscuring the view of the mountains almost without interruption for a fortnight. The smoke came from numerous forest fires up Bush river, Columbia river above Golden and at Albert Canyon. Each year these large forest fires destroy much valuable timber and are a serious menace to the timbering industry as well as to the safety of public and private property. Whether these fires all result from uncontrollable natural phenomena or from wilful negligence on the part of campers and prospectors it is difficult to ascertain; although I am certain of this, that men who have occasion to light fires in a timbered country during the dry season, do not always take proper precautions to see that their fires are completely extinguished; and I know from experience that a small fire which seems black and dead, may still be smouldering in the dry moss and loam, and on the slightest provocation from a friendly breeze may soon develop into a dangerous and destructive forest fire. The Bush Fire Act, while a stringent law, cannot be enforced over such a large territory without the interested co-operation of every man in the province.

Of flora and fauna I shall not speak. The many genera and species of mountain wild flowers which bloom with gay colours in valley and on mountain side are a continual source of pleasure and study to all lovers of nature, to whom I would recommend that excellent compilation 'Mountain Wild Flowers of Canada' by Mrs. Julia Henshaw, a Canadian. Professor Macoun's appendix to Mr. A. O. Wheeler's 'The Selkirk Range' deals exclusively with the mammals, birds, fish, flowers and berries of the Selkirks. And to those who are interested in large game 'Camp-fires in the Canadian Rockies' by Hornady-Phillips will prove most instructive and fascinating. Every day we hear the lament that large game is becoming scarce, nay extinct, in the mountains, but I assure all pessimistic hunters that there is game aplenty yet, if they are not too lazy to go a day's journey from the noisy railway.

I have the honour to be, sir,

Your obedient servant,

P. A. CARSON, D.L.S.

APPENDIX No. 18.

REPORT OF R. W. CAUTLEY, D.L.S.

SURVEY OF BLOCK OUTLINES IN THE PROVINCE OF ALBERTA.

EDMONTON, ALTA., March 28, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General.
Ottawa.

SIR.—I have the honour to submit the following report of my field operations during the past winter season 1906-07 under instructions of September 27, as amended under further instructions of October 31, 1906.

I commenced outfitting on October 13 at Edmonton, but owing to the state of the local labour market and the great difficulty I experienced in securing suitable horses at a reasonable price it was November 5 before I was finally able to start. The universal prosperity of this district during the past year and the great activity in railroad construction, building, farming and lumbering have resulted in creating an unlimited and therefore, unsatisfied demand for labour and horses, which has raised the wages of one and the price of the other to an unprecedented extent, so that it is

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not remarkable that the men who presented themselves for survey work should have been small in number and not up to the standard of former years. On November 7 there was a great snowstorm and I was obliged to leave the wagons, with which I had started out and proceed on the sleighs, and although the sleighing was very bad for a few days it soon became good and has continued so all winter.

Proceeding north on the Athabaska Landing wagon road, I arrived at the 17th base line on November 13. From November 13 to December 18 the whole party was occupied in cutting a sleigh road from the Athabaska Landing trail at the northeast corner of township 64, range 23, to the point of commencement at the northeast corner of township 64, range 17, west of the 4th meridian, a distance of 36 miles through country covered with heavy windfallen *brulé* or woods. This involved a serious loss of time and was the more disappointing because the country in the immediate vicinity of the Landing trail is partly open and otherwise covered with small poplar and willow through which it is very easy to make a road, but from what I now know of the country I am convinced that it was the most practicable method of procedure.

From December 19 to March 9, 1907, I surveyed the 17th base line through ranges 17 to 27 inclusive, closing on the 5th meridian, and resurveyed 10 miles of meridional section lines in ranges 22 and 23 to connect with work already done.

Having thus completed the work covered by my instructions I started back on March 11 and arriving in Edmonton on March 16, 1907, paid off my party.

There are several scattered settlements in the vicinity of ranges 21 and 22, tributary to the important and growing town of Athabaska Landing, but there yet remains much land that is suitable for settlement and there is no doubt that a large number of settlers will come into this country during the next year or two, particularly as it is served by the best and most heavily travelled wagon road out of Edmonton and Fort Saskatchewan, namely the Athabaska Landing trail. As it is, the people already settled at and near the Landing, seem to be very anxious for further subdivisions in their district and to expect a great advance both in population and development in the near future. Here, as elsewhere, the winter has been the most severe known for years, but there was at no time more than two feet of snow where I was working, which is at least a foot less than there was in Saskatchewan valley; the lowest temperatures recorded in camp were on the 2nd and 4th days of February, when the thermometer reading fell for a few hours below—50°, reaching a minimum of—56° F.

Moose were seen by members of the party on three occasions but being so near to the Landing, and to several small bands of Indians, the country is pretty well hunted and trapped over.

I have the honour to be, sir,

Your obedient servant,

R. W. CAUTLEY, *D.L.S.*

APPENDIX No. 19.

REPORT OF WM. CHRISTIE, *D.L.S.*

RESURVEYS IN EASTERN MANITOBA.

CHESLEY, ONT., February 5, 1907.

E. DEVILLE, Esq., *LL.D.*,
Surveyor General,
Ottawa.

SIR,—I have the honour, in accordance with my instructions to make the following report on my surveys in eastern Manitoba during the season of 1906.

SESSIONAL PAPER No. 25b

On April 30 I received your instructions dated April 27, by which I was instructed to make a retracement and restoration survey of those portions of townships 17, range 1, township 18, range 2, townships 19, ranges 3, 4 and 5, and townships 20, ranges 3, 4, 5 and 6, all west of the principal meridian, which had not been surveyed by Mr. Bray in 1905.

My instructions provided that I should consult with Mr. Geo. A. Grover, D.L.S., who was engaged on the same kind of work in townships east of those allotted to me, and be guided by any general instructions he might give. It was also provided that my party should consist of a cook and nine labourers, and that my transportation outfit should consist of a buckboard, two wagons and six horses. I was to take the outfit used by Mr. Nash in 1905. My party was to be organized at Winnipeg.

On May 4, I started for the west and proceeded directly to Teulon to consult with Mr. Grover. I arrived in Teulon on May 7, and on the 8th I drove out to see Mr. Grover, and received from him some valuable information regarding the nature of the survey. On May 9, I returned to Winnipeg and spent until the 16th, organizing my party and getting my outfit in readiness. On the 16th, I returned to Teulon, the outfit arriving there on the 17th. On the 19th, I left Teulon with the party for the work. I had decided to begin work in township 19, range 3, west of the principal meridian, since I had only received plans of this township and of township 19, range 4.

The route taken to reach this township was to follow the colonization road, leading from Teulon to Fisher river, as far as the east boundary of section 11, township 18, range 1, west of the principal meridian. From this point a trail leads in a north-westerly direction to Shoal lake and follows around the north shore of the lake. This road was in fairly good condition at the time we passed over it, but there is every indication that during wet weather it would be in a very bad condition. On May 21 we arrived in township 19, range 3, and on the 22nd commenced the survey.

(NOTE.—Description of the townships surveyed have been taken from this report and published as part of Appendix No. 46).

In township 19, range 3, comparatively few of the monuments of the original survey could be found. Such of them as could be found showed that the original survey had been very irregular. Only the outlines of this township were surveyed by Mr. Bray in 1905.

Only the outlines of township 19, range 4 had been resurveyed by Mr. Bray in 1905. In the east half of the township, most of the monuments of the original survey had been lost, while in the west half of the township most of the original monuments were still to be found. The original survey of this township was much less irregular than that of township 19, range 3.

Owing to a mistake in forwarding my mail from Winnipeg, at the time of surveying township 19, range 5, I had not received the plan showing the work previously done in the township. I was indebted to Mr. Grover for a sketch showing the lines surveyed by Mr. Martin, which I found very helpful though not altogether reliable. I was also informed by the settlers that a survey of the marshy land along the shore of lake Manitoba, and a traverse of the shore of the lake had been made during the winter or early spring of 1906. But at many of the section and quarter section corners, on the lines reported to have been surveyed, I failed to find any monuments. I therefore surveyed several of these lines again and established monuments.

In township 20, range 5, most of the meridian section lines and the central chord line had been surveyed by Mr. Bray in 1905. On the lines surveyed by me, I found only two of the monuments of the original survey.

In township 20, range 4, Mr. Bray had resurveyed all the meridian lines, except the north half of the east boundary of the township. He also surveyed eight and one-half miles of the interior chord lines, besides the chord outlines. Most of the monuments of the original survey had been lost.

In township 20, range 3, Mr. Bray had resurveyed the township outlines, with the

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exception of the west boundaries of sections 19, 30 and 31, the central meridional section line and the north boundaries of sections 13, 14 and 15. In this township some large discrepancies occurred between the original and the subsequent surveys.

On November 17, I completed the survey of township 17, range 1, and on the 19th started for Teulon with the outfit. As there was then from two and one-half to three feet of snow on the ground in that vicinity, travelling with wagons was very difficult. On the 20th we arrived in Teulon, and I received your telegram dated November 14, stating that a complete survey was required in township 22, range 4, east, before closing work, and that instructions had been mailed or would be mailed to Teulon. I did not receive the instructions.

As the snow was already so deep in that vicinity, I did not consider it expedient to try to make the survey referred to then, as it would be next to impossible to find old monuments under such a depth of snow. I accordingly telegraphed you for further instructions, and in reply was instructed to close operations and discharge my party, which I proceeded to do.

I stored the outfit with Mr. W. C. McKinnell, of Teulon, into whose charge I also gave the horses to be wintered.

I have the honour to be, sir,
Your obedient servant,

WM. CHRISTIE, *D.L.S.*

APPENDIX No. 20.

REPORT OF W. J. DEANS, *D.L.S.*

SURVEYS AND RESURVEYS IN THE PROVINCES OF MANITOBA AND SASKATCHEWAN.

BRANDON, MAN., February 9, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa, Ont.

SIR,—I have the honour to submit the following general report of my survey operations during the season of 1906, in the provinces of Manitoba and Saskatchewan.

Having received your instructions of January 11 in reference to subdividing the marsh lands adjoining the shores of lake Manitoba I organized a small survey party at Brandon and left for Oak Point on January 20. On my arrival at Oak Point I interviewed Mr. Reykdal, who was wintering Mr. Edgar Bray's outfit. I got two horses from him, and purchased a sleigh, and on January 25 left Oak Point to commence work in township 19, range 5, west of the principal meridian. In this township I extended lines subdividing all the marsh and land right to the shore of lake Manitoba. The part of the township which I subdivided is a large marsh, separated from the lake by a sandy beach, varying in width from three to five chains. Most of the marsh is covered with water, but there are some few ridges of dry land. There are a number of creeks or channels running through the marsh to the lake; considerable hay is cut on the ridges in the marsh, although it must be a difficult matter to get horses and machinery out to do the work.

In township 19, range 6, west of the principal meridian, I retraced all the lines and extended the eastern boundary south to the lake shore. This fractional township is largely hay land and marsh, although there are a few small areas which would no doubt produce grain. The settlers are largely engaged in cattle raising and dairying.

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In township 18, range 5, west of the principal meridian, I extended the lines through the marsh to the lake shore, thus subdividing the township completely. The westerly part of this township is marsh, except a narrow sandy beach along the shore of lake Manitoba. This beach varies in width from three to five chains, and in places is covered with small poplar and willow. The Oak Point Shooting Club have buildings on section 27 in this township. There are a few ridges and islands of high land throughout the marsh on which hay is cut, but most of the marsh is covered with water, and in numerous places large ponds of water exist. Wild ducks abound throughout the season, and some of the settlers make considerable money shooting them and shipping to Winnipeg. Large quantities of fish are taken from lake Manitoba by the settlers, who find a ready market for them at Oak Point. I was greatly retarded in carrying out this work by cold, stormy weather which prevailed during February.

In township 16, range 4, west of the principal meridian, I retraced some of the lines along the lake shore and ran some which were omitted in the original survey. The sketch furnished me of this township showed the south boundary extending some ten chains farther west than it does at the present time. There either was an error in the original survey or considerable of the beach has been washed away by the lake. St. Laurent, a village located in this township, is quite a thriving place, and in summer time is much patronized by the people of Winnipeg as a summer resort.

On April 23 I received your instructions in reference to retracements and restoration surveys in townships 6 and 7, ranges 28 and 29, west of the principal meridian. I immediately went to Oak Point, took over the balance of Mr. Edgar Bray's outfit, strengthened my party as instructed, and started for Portage la Prairie, in which place I arrived Wednesday, April 25. Here I engaged a car and shipped the outfit to Reston, arriving there on April 27. I intended that my first camp should have been at Reston, but afterwards thought it would be better to move to Sinclair, a point nine miles west. I accordingly moved there and started work. I found most of the horses in my outfit in very poor condition and unable to do the work satisfactorily, but after a week of good care they improved so that I was able to carry on the work and to make good progress. I found a great many of the mounds throughout these townships badly obliterated and in great need of restoration. These four townships are well settled, but I was very much surprised to find that only about ten per cent (10 per cent) of the land is under cultivation. The price of wild lands in these townships varies from ten dollars to fifteen dollars an acre. One settler told me that he paid fourteen dollars an acre for a section of land and paid for it with the proceeds of two crops of wheat. One great drawback for the settlers in these townships is the scarcity of fuel, they being entirely dependent on the railways for the supply, which is brought in from outside points. We had a great deal of rain during May and June, which interfered with the carrying on of the work considerably, but which was of inestimable value to the growing crops. I completed this work on Monday, June 25, and on the 26th started by road for township 27, range 9, west of the second meridian, being unable to get any satisfaction from the Canadian Pacific railway representatives at Sinclair as to when I could procure a car. I arrived at this township on July 4. My instructions were to rectify an error which existed in the survey of this township. I retraced all the lines in the easterly half, and found the east boundary of section 34 to be 14.43 chains short, while the east boundary of the south half of section 3 was 10.70 chains too long. The settler owning the south half of section 3 would not sign a petition to have the survey rectified, so that it was impossible for me to do anything more than retrace the lines and restore the monuments. On July 14, I moved the outfit to Stoughton, a station on the Arcola branch of the Canadian Pacific railway, and procured a car and shipped the outfit to Sinclair, from which place I moved the outfit to township 5, range 29, west of the principal meridian, and started to retrace the lines and restore the monuments in this township and also in township 5, range 28, west of the principal meridian. I completed the work in these townships on August 6, and on the 7th moved camp to township

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9, range 29, west of the principal meridian, where I had instructions to retrace the lines and restore the monuments. I also retraced the lines and restored the monuments in township 8, range 29, west of the principal meridian. On August 24, I moved the camp to township 8, range 28, west of the principal meridian, and retraced the lines and restored the monuments in this township. On September 5, I moved the camp to township 7, range 27, west of the principal meridian, and retraced the lines and restored the monuments there. This latter township is nearly all under cultivation and produces large quantities of wheat of the best quality, which is marketed at Reston, a prosperous town of some three or four hundred inhabitants.

On September 13, I moved the outfit into Reston, and shipped the same by train to Gladstone. My instructions were to subdivide those portions of Big-grass marsh which had dried up in townships 15, 16, 17 and 18, ranges 10 and 11, west of the principal meridian. In order to do this work I moved the camp to section 16, township 15, range 11, west of the principal meridian. After completing as much of the work as possible from this camp, I moved to section 28, township 17, range 11, and after working here for some time I moved the camp to section 5, township 17, range 10. From this camp I completed the work. I found the monuments in townships 17 and 18, range 10, badly obliterated. I would recommend that the rest of the lines in these townships be retraced and the monuments restored.

Big-grass marsh appears to be in much the same condition now as at the time of the original survey, except the southerly and westerly parts, which are now much drier, owing to the drainage work which has been carried out in the southerly part. If the water in Big-grass river, which enters the north end of the marsh, were carried to a proper outlet, a large portion of the marsh would be drained and the lands adjoining advantageously affected. I completed the work for the season on October 25 and paid off the men. On the 27th I stored the outfit and started for Brandon, where I arrived on the 29th.

I have the honour to be, sir,

Your obedient servant,

W. J. DEANS, *D.L.S.*

APPENDIX No. 21.

REPORT OF C. C. FAIRCHILD, *D.L.S.*

SURVEYS IN SOUTHERN ALBERTA.

BRANTFORD, Jan. 28, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to report as follows pursuant to instructions dated April 14, 1906.

I left Brantford on May 7, and proceeded to Calgary where I gathered a party and went on to Banff where I arrived on May 12. I went into camp and began actual operations on May 17, commencing with the unfinished portion of township 26, range 11, west of the fifth meridian.

The first part of the season's work consisted of a subdivision of the coal area around Bankhead, which practically embraced Cascade mountain and the valley of Cascade river to the north and east of the mountain and a part of the range on the north and east of this valley.

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We were considerably hindered by continuous cloudy weather and numerous rainy days, and I was unable to get an astronomical observation until June 20. The interim was spent in retracing and producing the old lines in township 26, range 11, and running new lines in this township and in township 26, range 12. The east boundary of section 14, township 26, range 12, passes a little to the east of the peak of Cascade mountain which is only accessible from the west side.

I spent from June 28 to July 9 moving camp to this accessible side and in attempting to carry this line over the mountain, but was unable to reach it at any point and was forced to give up, but not until after we had scaled the highest peaks in vain efforts to produce the line. The snow was four feet deep in many places and soft and sliding, rendering climbing both difficult and dangerous. On retiring from this effort, I proceeded with the lines on the east and north of the mountain carrying them up in each case as far as possible to the base of an inaccessible cliff, which skirts all the east and northeasterly face of the mountain.

While engaged in this work, I had the misfortune to smash my Watt's transit rendering it practically useless. One of my men who was helping me up the mountain with it fell, and, while he was not seriously injured, the transit was broken by having the main spindle broken, so that the head with the upper plate rolled one way while the tripod and lower plate went with my assistant.

A heavy growth of timber fills the river valley and the lower slopes of the mountain as far north as the north boundary of sections 20 and 21, township 27, range 12. From this point north there is a heavy forest of fire-killed spruce and pine, standing for the most part, but rapidly falling and covering the ground with a tangled mass of logs and limbs. In some places south of the aforementioned boundary of sections 20 and 21, fire has gone through and killed the timber which has fallen, and a new growth of apparently about twenty years has covered these areas. The tangled masses of fallen timber on the sides of the mountains make climbing and running lines extremely slow and difficult. We found little pasture for horses until after passing into the fire-killed section to the north where the grass is very good.

In order to get at the unfinished lines on top of and on the westerly slope of the mountain, I opened a trail from Cascade river southerly along the valley between Cascade and Sawback mountains. The camps along the trail were from one to three miles from the work, but were the most convenient I could get, and necessitated a climb every morning up the side of a mountain covered with fallen timber.

A greater part of the actual work was above the timber line between seven and nine thousand feet above sea level. When I arrived at the southern end of this valley between Cascade and Sawback mountains, I was forced to open a trail over Stony Squaw mountain, or return as I had come in by a thirty mile detour to make two miles. I accordingly opened this trail, and with a little work it would make a much shorter and easier route from Banff to the Panther creek and Red Deer sections of the mountains to the north of Banff.

All of the country surveyed east and northeast of Cascade mountain has been prospected and many seams of coal were seen on which more or less work had been done. On one stream in section 29, township 26, range 11 and section 25, township 26, range 12 fourteen different openings all showing coal were seen.

We had few accidents with the pack train but found it both necessary and difficult to keep shoes on the horses. The dead timber made trail making difficult and was extremely hard on pack sacks and covers. Some of the horses were rather severely snagged but none were permanently injured.

One thing that impressed me, was the scarcity of game in the more outlying parts of our work. More game was seen between Banff and Bankhead and between Banff and Canmore, than in any other part. Evidences of game having been killed were seen and shots were heard while in the Cascade river valley, but the hunters were never seen. I am inclined to think that they were Indians as they did not enter the valley by the trails ordinarily in use by the residents of the district. Cascade river

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valley is an ideal place for deer, sheep and goat but the scarcity might be accounted for to some degree by the fact that we saw both grizzly bear and mountain lion there. I think more thorough protection of the game should be exercised if it is desired to make the Park a breeding ground.

The following other surveys were also made :—

1. John Brewster, lease.
2. Lots at lake Minnewanka.
3. Grandview villa lots.
4. Traverse of Bow and Cascade rivers in township 25, ranges 11 and 12.
5. Correction to survey of east boundary of section 23, township 24, range 8 and retracement of the south boundary of the Indian reserve across the same township.
6. N. K. Luxton, lease of villa lot.
7. Resurvey of various villa lots in Banff.

In making the traverse of Fortymile creek for the John Brewster lease, two days were spent in looking for an old post or monument on the north boundary of the old park without success, but after the snow had disappeared a post was found burnt off. This country has all been burnt over since the old survey. I found no mound in retracing 119 chains of this line southwesterly from the creek, although such are shown in the old notes and plan.

In the traverse of Bow river we found the Canadian Pacific railway employees building a dam near the middle line of township 25, range 11 to deviate the river through a canal, which they have constructed. This deviation will do away with two bridges on the railway line, if the river can be made to take and hold the new channel. These improvements are noted in the traverse. As the river was partially frozen but not sufficiently so for us to cross on the ice, we were handicapped to a certain extent in the traverse work. I completed all the work for which I had instructions on Saturday, November 24, disposed of my outfit on the 26th and left for home on the same night, and arrived in Brantford on December 1.

I have the honour to be, sir,
Your obedient servant,

C. C. FAIRCHILD, *D.L.S.*

APPENDIX No. 22.

REPORT OF LOUIS E. FONTAINE, *D.L.S.*,

SURVEYS AND RESURVEYS IN CENTRAL ALBERTA, INSPECTION OF CONTRACTS IN CENTRAL AND SOUTHERN ALBERTA.

LÉVIS, QUE., January 28, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR.—I have the honour to submit the following general report concerning my survey operations in Alberta during the past season, under instructions from you dated April 19, together with subsequent instructions of June 15 and September 29.

I left Lévis on April 24 and proceeded to Edmonton, Alberta, where I was to organize my party. For a few days following my arrival I was engaged in collecting transport outfit, overhauling the same, engaging men, ordering supplies and completing the organization. By this time the spring rains had set in, thereby making the

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roads soft and miry; and as most of the horses were fresh off the range, I was obliged to postpone my departure. Eventually, conditions being favourable, I left Edmonton and proceeded by way of Sprucegrove, Stonyplain and Mewassin, and from there to the northwest quarter of section 31, township 50, range 3, west of the fifth meridian, where I was to begin the restoration survey in the said township and range.

In proceeding with the work, I must say that the lines previously run were so obliterated that all attempts to follow them throughout proved futile. The only vestiges being in the islets of green timber spared by the lumbering operations and fire. The charred or rotten remains of posts were generally buried under a thick accumulation of hay, leaves, wood and moss.

While operating in this township, I must say that Mr. Bruin gave us great attention. His first move was to totally destroy a cache of supplies, and following his clue handled my transit very roughly, during our temporary absence from the line. However, as I had an ample supply of provisions stored at a farm house on the north side of Saskatchewan river, and also a second transit, the inconvenience and loss of time resulting thereby amounted to only two days.

A detailed report as to the general resources of this township will be found in the official field-book.

My next move was to proceed to Edmonton, where I made a stay of two days for necessary repairs to the transport outfit, and the ordering of supplies; thence left to carry out operations as instructed by your letter of June 15.

These operations were of a varied character and consisted mainly in the taking of observations, investigating the marking of certain boundary corners and completing the traverse of certain lakes. As this was done in no less than fourteen townships, I think it would be superfluous to enumerate each of them here, as the returns show fully what was performed in each case.

In order to achieve the purpose in view, I had occasion to cross this section of the province of Alberta, comprised between the fourth and fifth meridians, and townships 37 to 52.

While performing this journey, I may state that it was hardly conceivable what great changes had taken place in this district since my first visit in 1898. Then a farm-house or a ranch would be found only every thirty or forty miles, whilst at the present time you are never without sight of the one or the other. Moreover, in several townships, not a quarter section is to be had for settlement and instead of what was formerly a vast wilderness, beautiful fields of waving grain are to be seen in all directions. Settlers are continually coming into this very fertile district, and day after day they are to be met with on the main trails making their way to their new homes, with wagon loads of their implements and effects.

Access is very easy to this district and it is traversed in several directions by a number of good main trails, and ere long it will have good transportation facilities by rail. Two of the grading outfits of the Grand Trunk Pacific were met, one in township 43, range 1, and the other in township 44, range 6, both west of the fourth meridian. On the other hand, trial location lines for the extension of the Lacombe branch of the Canadian Pacific railway, are staked in townships 38, ranges 7 and 8, west of the fourth meridian. The same company is also engaged in building an extension bridge across Battle river, at Hardisty, and it was proposed to complete the grading on the east side of said river to a distance of fifteen miles before fall.

In this section, fresh water is to be had in almost all lakes and sloughs. In boring wells, good water is obtained at almost any place at a depth varying from ten to forty feet.

During the course of last season, a vast area in this section was devastated by prairie fires, thereby causing more or less damage to farmers and stockmen. On two occasions, during the night, I had to waken up the whole crew and set it to work burning fire guards around the camp premises, and I may say that if these precau-

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tions had not been taken in the proper time, the whole of the transport and camping material would have been destroyed.

Wood for fuel, although in limited quantities, is obtainable in the ravines of most of the creeks emptying into Battle river. On the other hand, good coal veins are to be found in several places; some of them are being operated by private capital and the output from the same, at present, is sufficient to supply the local demand.

Having given a brief description of the territory traversed while carrying on operations called for by the second portion of your instructions, I will now resume the general trend of my report.

On October 5, I left Lavoy, one of the distributing centres of the Vermilion district, situated eighty miles east of Edmonton, on the main line of the Canadian Northern railway, and proceeded to Sullivan lake, where I was to begin the examination of survey contract No. 22.

In these townships adjacent to the lake, I carried on the operations called for and then went to Red Deer river, where three townships forming part of the same contract were to be subdivided. On my arrival, I learned that the contractor had left after subdividing township 28, range 18. Accordingly I examined the said township and then proceeded to Chin coulée, by way of Gleichen and Lethbridge, to examine contract No. 5. The necessary operations were duly carried on, and on their completion, I left for Calgary.

On my arrival there, the season being so advanced, and the horses so fagged by so much moving that I decided to cease operations for the season. I therefore made arrangements for the wintering of the horses and transport outfit. I then left for Edmonton, and there discharged the party on December 12.

After providing for the storing of part of the transport outfit left here in August, I left for home, where I arrived on December 23.

I have the honour to be, sir,
Your obedient servant,

LOUIS E. FONTAINE, D.L.S.

APPENDIX No. 23.

REPORT OF GEORGE A. GROVER, D.L.S.

RESURVEYS IN MANITOBA, INSPECTION OF CONTRACTS IN EASTERN MANITOBA.

KINGSTON, ONT., January 28, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR.—I have the honour to submit the following report upon my survey operations for your department during the past season.

Under your instructions dated April 12, 1906, I left home on April 23, and arrived in Winnipeg on the 25th.

Winnipeg, as usual, was full of activity, and the hotels were crowded. It is a wonderful market both for men and supplies, there being plenty of work, and plenty of men and the stores carry stocks of goods that twice the population would scarcely warrant in the east. I spent a couple of days there getting supplies and engaging my party and then proceeded to Teulon to pick up my outfit, which I had stored there at the close of the previous season.

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For some years past Teulon has been the 'end of steel' on the Stonewall branch of the Canadian Pacific railway, but this year they were extending the line farther north, purposing, I believe, eventually to run to Icelandic river, on lake Winnipeg. This should prove a profitable line, for though the country is at present largely broken by marshes and swamps, these should gradually diminish with deforestation, and the soil in nearly all parts is excellent.

I do not fancy that this country will be a great wheat growing one, at least for many years to come, but it would seem to be well adapted to mixed farming and dairying. For the poor man a wooded country is preferable to the prairie, as he has building material and fuel at his door and can make his home for his labour. The proximity to the great and rapidly growing market of Winnipeg will also assure the settler of a demand for his products and guarantee him his necessities at fairly reasonable prices.

The Canadian Northern railway is also extending, or talking of extending, its line along the shores of lake Manitoba from Oak Point. This should also prove a valuable extension but there is a wide stretch between the two lakes (Winnipeg and Manitoba) that neither road seems desirous of entering, why, I do not know unless for economic reasons of their own. It is a fertile country and fairly well settled, particularly when its distance from the railway and the difficulty of road travel are considered. Moreover this should be a cheap country to build a road through, there being no great engineering difficulties to overcome. Transportation is the question of the hour from London's most crowded boroughs to the sparsely settled portion of our great West.

In this country moose, elk, deer and other large and small game as well as wild fowl and ducks are plentiful. In the fall the woods are infested with hunters and, owing to the vague ideas which some of them have of the appearance of game, they lend a spice of excitement if not of actual danger to our work.

This country to the north of Teulon is quite a characteristic sample of the West and conveys a good idea of the heterogeneous nature of our immigrants. Here one finds all classes and conditions of men jostling elbows. Norwegians, Swedes and Finns from northern Europe living as neighbours to the French, Galicians and Spaniards from the southern half of the continent and the whole leavened by Americans, English and Canadians (both French and English speaking), not settled in separate colonies but all the different races side by side. This commingling of races, while very interesting from an ethnological view point, causes some real difficulties in practical government. Very seldom do a man and his immediate neighbour speak the same tongue and though they may have a knowledge of English it is in most cases not a very intimate one and it is almost impossible to avoid constant bickerings that are quite unnecessary. Each race has an inborn distrust of the others which nothing will entirely overcome. Add to this the difficulty any man finds in expressing himself adequately in any but his mother tongue and the consequent misunderstandings afford a difficult proposition indeed. The wonder is not that the immigration and other officials have difficulties but rather that they have been able to cope with them so successfully on the whole. We can only hope that the next generation or, if not, at least the third will gradually forget their old world jealousies and mistrusts and grow to understand that we are all Canadians with a common future no matter what our past may have been.

I spent a day or two in Teulon getting my outfit overhauled and my stores collected and proceeded north into my first work where I arrived on the 3rd day of May and on the following day started my season's work in township 19, range 1, west of the principal meridian. This township, though stony in places, has excellent soil and one settler stated that he had grown fifty bushels of onions on a patch about fifty feet square. He assured me that all kinds of vegetables and grain do remarkably

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well here. There are two or three large marshes in this township which supply hay and water for the cattle.

Township 20, range 1, west of the principal meridian, was the next visited, and it is very similar to its neighbour to the south, with the exception that no considerable marshes are met with.

In township 20, range 2, west of the principal meridian, there seemed to be less stone, but the marshes were large and deep.

Township 19, range 2, west of the principal meridian, is similar to its northerly neighbour, but there is less stone and less marsh land.

Township 18, range 1, west of the principal meridian, has perhaps more stone than any of the other townships visited in the vicinity, but practically all the homesteads are occupied, and the settlers seem to be able to easily clear their land.

In township 18, range 1, east of the principal meridian, the settlers are not so far advanced owing to the lack of roads and the rather heavier bush, but the soil is good, and I think a few years will witness quite an improvement.

In all these townships, I had the previous year retraced Mr. Martin's lines, and this year was making the re-subdivision complete, rendered necessary by the gross errors in the original survey, the great discrepancies between it and Mr. Martin's resurvey, and the fact that all the old posts were lost. Many of the settlers expressed their appreciation of the work, and I hope it may help to a more peaceful understanding among the various people, although I think some of them would hardly be satisfied unless the government carefully fenced their land and gave it to them.

The settlers in all these townships seem to be getting along nicely, and in township 18, range 1, west of the principal meridian, there are some very good farms and a nice little school has been built recently. Although they are a long way from the railway, one settler has a threshing machine, and there is considerable grain grown. Most of the settlers, however, have so far contented themselves with clearing their land, putting up buildings and attending to a garden and a few cattle, which latter represent their savings when they hire out, as most of them do, for part of the year.

The timber in this country makes good fuel and temporary buildings, being mostly poplar, though there is a little spruce in some places. A good deal of poplar is cut and shipped into Winnipeg as cordwood.

In several places we saw outcrops of limestone of a creamy colour, which was said to make first-class lime, and from all appearances would make a good building stone if it could be marketed.

In the rush west this country seems to have been overlooked, but I think from now on there should be continuous, even if somewhat slow, progress.

On July 10, I started from township 18, range 1, west of the principal meridian, to move into township 22, range 7, west of the principal meridian. We went by way of the trail around the head of Shoal lake to Oak Point, and thence by the Colonization road to Scotch bay, and from there used settlers' and Indian trails, none of which were very good.

We had a peculiar season, in that the spring was remarkably dry, and heavy rains did not commence until late in June and continued well into July. This spoiled the roads just at the time we wanted to use them, but in one way was a blessing, for the mosquito crop was unusually light.

Along the shores of Shoal lake and between that and lake Manitoba is a fine pastoral country composed of great hay meadows or flats, with just enough bush to shelter the stock, and most of the settlers were engaged in cattle raising and dairying.

Oak Point is situated in a park-like piece of country, with oak clumps and prairie alternating, and facing on lake Manitoba. For natural beauty it would be difficult to surpass, and I believe man is to do his part and will soon turn it into a beautiful summer resort.

This country has been settled for some time, and I met several farmers who had started with nothing and now own well stocked farms of from one hundred and sixty to four hundred and eighty acres, cattle forming a large part of their assets.

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Cream is shipped from here to Winnipeg in large quantities, which will doubtless increase when better facilities for handling are provided.

Travelling north the country gradually becomes less open and the bush changes to the familiar poplar once more. The trails get gradually worse as the limits of settlement are reached, though I must confess I saw them at their worst, which means well nigh impassable.

Reaching township 22, range 7, west of the principal meridian, on July 14, I found that only two or three families were in actual residence—the others awaiting the resurvey to get accurately located. An examination of the south boundary of the township showed that I must be prepared for very unusual work, and I was therefore not surprised at the condition in which I found the interior lines.

I ran a trial line the full six miles across the south of the township to give myself a base from which to work, and from it I laid out my meridians to join the section corners on the south outline with those on the north as closely as possible. It was impossible to correct the old survey without interfering with the adjoining townships, and I consequently was forced to modify my work by the old corners when I found them. This gave most peculiar results, as my technical returns show, but I left good monuments on the ground, and gave correct chainages and azimuth between them, which was about the best I could do.

This township, township 22, range 7, west of the principal meridian, is well suited for mixed farming and dairying, the soil being a rich black loam with clay subsoil. The surface of the country is gently rolling and is well timbered with poplar, some of good size, on the ridges and interspersed with hay meadows in the depressions. This alternation extending as it does through the township gives plenty of building material and fuel and good feed for stock. Game was fairly plentiful and some of the settlers catch a good many fish in lake Manitoba.

From township 22, range 7, I proceeded, in consequence of your instructions, into township 22, range 8, west of the principal meridian, the east outline of which had been re-run in connection with the resurvey of the former township. To get into township 22, range 8, we passed through the Sou Sonse Indian reserve, which is a very pretty piece of country along a fine sandy beach on lake Manitoba. The road along the shore is picturesque and park-like in the extreme and the adjoining land raises hay in abundance though the Indians seem to disdain the cultivation of any of it. They keep a few cattle and live chiefly by fishing and hunting. I fancy that with the advance of civilization they will want to move farther back, which would open a nice piece of country to settlement.

Township 22, range 8, is largely broken into by this reserve and, as I had no instructions to re-run the reserve boundaries and the old lines were lost I judged it best to keep at a safe distance from it. At the same time I placed sufficient corners to guide the settlers in their choice and closed all my surveys. From here I proceeded, as the season was well advanced, to the inspection of certain contracts of 1906 in accordance with your instructions.

I made my first inspection in townships 23 and 24, range 7, west of the principal meridian, being part of contract No. 6 of 1906, held by Mr. J. L. R. Parsons.

To change from re-tracing old lines run twenty years ago to inspecting present day contract work is, I fear, not in the interest of rigid inspections. There has been such an improvement, not in any particular, but in every detail of the surveys made in this country in the past twenty years that one would hesitate to speak of them as being the same class of work. In no way could the advantage of the numerous changes in the manual and in the field instruments used, be more markedly illustrated than by this change which I was forced to make this season.

The lines examined in contracts of 1906 were straight, the chainage good and the corners were well marked, none of which could be said, as a rule, of the more ancient surveys in this country. I had, I may say, one pleasant surprise during the summer when I re-ran a meridian outline, run thirty years ago, and checked almost precisely

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both in azimuth and chainage but this stood out as a brilliant exception to the rest of those surveys.

On the contrary I found the surveys of to-day very satisfactory in every case; the clause regarding opening and blazing of lines was not always interpreted according to my ideas but in all other respects I thought the work was generally creditable both to the contractors and to the department and I cannot conceive that any such surveys as I have been retracing could be passed so long as the present system is enforced with intelligence and honesty.

From township 23, range 7, west of the principal meridian I proceeded south via Oak Point, Stonewall, Winnipeg and Ste. Anne to my inspections in southeastern Manitoba. When passing through Winnipeg I dismissed three of my party, reducing its strength to six, exclusive of the cook and myself, which I found ample for inspection purposes.

The roads were by this time in good condition and I had no difficulty in moving, but the carts which I was using did not allow great speed. I have used these carts now for two seasons and, though they have merits, I think on the whole wagons are preferable and they are much more readily replaced.

In travelling from Oak Point to Ste. Anne I rested over Sunday on the southwest shore of Shoal lake and, calling on one of the settlers in the afternoon, I was surprised to note quite a pan full of salite or crystalized salt which he informed me had been deposited in his kettle through evaporation of water. His well was only a few feet deep and I was led to wonder if valuable salt solutions might not be found at greater depth. The settler himself was unaware of the nature of the mineral until, at my suggestion, he tested it. He had not noticed any salty flavour to his drinking water but to me it was quite perceptible. His house was on a rather sandy ridge quite close to the shore of the lake.

From Ste. Anne I proceeded along the Dawson road to the contracts reached by it. The road itself I found in good shape there having been considerable grading done on it and the small bridges being kept up by the farmers. The piers of the old bridge on Whitemouth river are still visible but are in a ruined state, the superstructure having disappeared. However, at the time I reached it the river was not difficult to cross there being good bottom with water not over three feet deep and the approaches were not too steep. Sportsmen are the chief inhabitants of this country though there are a few settlers and an occasional lumber camp.

After inspecting contracts Nos. 6 and 4, I moved south through contract No. 10, inspecting it on my way to Woodridge, and from there went by the trail running almost due east into contract No. 3. I inspected this contract and continued south on the west side of Whitemouth lake, through Vassar and Pine Valley into townships 1 and 2, ranges 10 and 11, east of the principal meridian, being part of contract No. 7.

Whitemouth lake is a fine open piece of water, with a fringe of hay meadow or marsh along the shore. At the time I was in the vicinity there were great numbers of wild geese on the lake, but it was difficult to get close enough to kill them.

Vassar is only a station, but there is some settlement in the neighbourhood.

Pine Valley is the name given to a small settlement adjoining Piney station on the new Canadian Northern extension from Emerson to Sprague, nearly parallel to the international boundary, known as the Ridgeville branch. This branch has been in operation only for a short time. At Pine Valley I met several contented and prosperous settlers, doing well in a country that a few years ago was principally swamp. This place seems to be settling up rapidly, and there seems to be some good land in the vicinity.

The difficulty in southeastern Manitoba is to distinguish the good land from the bad, so much of it being covered by moss and swamp, under which the soil may be good or may be very sandy, as it is in many places.

While we were camped in township 1, range 10, east of the principal meridian, the big blizzard of November 16 caught us. Fortunately we were camped in a sheltered

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spot, but I was forced to buy hay for my horses, as the feed was very meagre before the storm and, with five feet of snow, it was almost impossible for them to get anything.

I had previously thought of storing my outfit in Pine Valley, and this storm quite decided me to do so, as it was ridiculous to think of starting on a long move through the snow with carts. I therefore stored my outfit in Pine Valley and took train for Winnipeg, where I discharged most of my party, retaining only my cook and two other men to finish the season.

For the inspection of scattered contracts a small party, with the use of railway and hired transport, is expeditious and, I think, economical for the department, but not for the surveyor paid by allowances.

I then proceeded by train to Makinak, purposing to inspect contract No. 9, but on my arrival I learned that the contractor, Mr. Dumais, had left the work early in the summer on account of water, after doing very little work, and had not returned. I therefore thought it would be a waste of time to go farther, so I took the next train to Grandview, where I hired a team and drove out to the inspection of contract No. 5.

We were engaged on this work while the weather was quite severe, and I was surprised to see the threshers working outdoors with the thermometer about 30° below zero and a couple of feet of snow on the ground.

The land in this vicinity is, however, excellent, and this year between heavy crops and additional acreage the threshers were quite unequal to the demand, and consequently had to make a long season of it.

This country is well settled right up to the borders of the timber reserves, and the settlers seem to be doing well. They are largely Canadian, English and American, and are very progressive, Grandview being quite a good sized town with every appearance of prosperity.

After completing the inspection of contract No. 5 I returned to Winnipeg and proceeded to Lac du Bonnet to the inspection of contract No. 8. Finishing this, I returned to Winnipeg, discharged the remainder of my party and took train for the east, arriving home on December 24.

I have the honour to be, sir,
Your obedient servant,

GEO. A. GROVER, *D.L.S.*

APPENDIX No. 24.

REPORT OF A. H. HAWKINS, *D.L.S.*

SURVEYS AND RESURVEYS IN SOUTHERN SASKATCHEWAN AND SOUTHERN ALBERTA.

LISTOWEL, February 26, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour in accordance with my instructions, to submit the following general report on surveys performed by me, during the season June to December, 1906.

Upon receipt of your instructions dated May 15, 1906, I began at once to prepare for the season's work, by opening correspondence with your department, relative to securing instruments that would enable me to perform the work with the greatest degree of accuracy possible. Upon receipt of my sidereal time piece, I left my home

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in Listowel on June 7, en route to Medicine Hat, via Owen Sound and Canadian Pacific Railway steamer *Athabaska* for Fort William, and from thence by rail to my destination, where I arrived June 11. I at once set to work to secure the necessary outfit, in which work I was materially assisted by Mr. F. G. Foster, mayor of Medicine Hat, and Mr. L. B. Cochrane, government agent.

The work of organization was somewhat slow, as there was no horse market in this place, and every person owning animals seemed anxious to dispose of them, at what appeared to me fancy prices, but after a thorough canvass of the material offered, I selected three teams, that I thought would be what was required, and which proved an excellent lot for the purpose. The other parts of my outfit were more easily secured. Plenty of men offered themselves as labourers, but careful selection is very necessary. A cook, however, seemed impossible, and I did not get as good a man during the whole season, as the wages offered should have secured.

On June 21, we started for our first work, being the subdivision of township 2, range 29, west of the 3rd meridian. We travelled south along the valley of Bullshead creek, intending to cross Cypress hills, via the Royal Northwest Mounted Police post lodge, but at 2.30 p.m., a rain storm started in, that turned the trails to streams of mud, and we camped in a settler's vacant cabin, where we remained until the morning of the 23rd. The trails were very soft, so that I put four horses on my heaviest wagon, and traileed the buckboard. Several bridges had been washed out, and the trails were very heavy, so that our progress was slow. The rapid settlement, and consequent fencing of old and opening of new trails delayed us somewhat, but we arrived at our destination on the evening of the 26th and camped on Middle creek in a pasture owned by Mr. E. Peachy, who kindly gave his permission.

The country in the vicinity of Cypress hills is fairly well settled, and considerable attention to mixed farming seems to be the rule. South of the hills, however, settlers are much more scattered, and cattle or horse raising seems to be the more profitable and popular employment, and the soil seems to change in character. South of the hills is a heavy clay, with considerable stone, while the immediate vicinity of the hills is more of a loamy nature.

Township 2, range 29, west of the third meridian, is a rolling prairie, traversed its entire length by Middle creek, and across its southwestern portion by Lodge creek. The soil is generally third and fourth class, and is a hard clay with numerous very stony patches, except the valleys which are comparatively narrow, where it is a clay or sandy loam, easily cultivated and very fertile but subject to inundation during the spring, as these streams, as is the case with all prairie streams, rise and fall with great rapidity.

There are three settlers in this township, Mr. Peachy in the north, Mr. M. Lynch in the centre and Mr. D. A. Hammond in the southern portion of the township. Mr. Peachy has a very fine band of Percheron horses, numbering some 80 head, as well as some 200 cattle. Mr. Lynch and Mr. Hammond have each about 250 head of cattle, and all doing well. All three of these gentlemen are working on irrigation schemes, their object being to cultivate as much of the bottom land as possible, in order to raise feed for the more efficient wintering of their growing herds, and which I have no doubt will add very materially to their prosperity and to the value of their holdings.

There are several other very desirable locations along these valleys for small ranchers, and I am informed that there are some very excellent and prosperous locations on Middle creek, to the north of this township.

All of these settlers, and Sergeant Allan of the Royal Northwest Mounted Police testified as to the excellent garden produce raised in the valleys, so that I am quite sure, that cultivation only is needed to raise what hay, grain or vegetables are required.

There is no timber in this township, a few bunches of willows, from 1 to 2 inches in diameter, being all we found, but timber may be obtained for fuel or for building purposes in Cypress hills and at present a sawmill is in operation there, and distant from 40 to 50 miles from the township.

Coal may be obtained at a place some 10 miles south of this township, in the state

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of Montana, where the settlers dig out what they require. It is easily accessible, and appears to be sufficient in quantity, and a fairly good lignite, containing however considerable sulphur.

The grass on the uplands is nearly all blue-joint, and appears to be very nutritious, but rather short, indeed that cut for hay in this vicinity would average only from four to six inches in length.

Fairly good trails lead from Medicine Hat and Maple Creek to this locality, and a good trail leads from Havre, a station on the Great Northern railway, which is some thirty miles to the south.

Upon the completion of this township we crossed Lodge creek and started westward for our next work in township 1, range 8, west of the fourth meridian passing en route some of the finest hay lands seen by the writer during the season. These lands lie along both sides of Sage creek, and were covered with a heavy growth of blue-joint and pea-vine, eight to ten inches high at the time of my visit, and very luxuriant.

This country is all a rolling prairie, the land, however, apparently improving in quality as you proceed westward.

As Milk river is approached, the surface becomes more rolling and rugged, and broken by small coulées leading into Lost river (which flows into Pakowki lake) and into Milk river. The retracement of the east boundaries of townships 1, 2, 3 and 4, range 9, and the survey of the east boundary of township 1, range 8, now engaged our attention. I regret to have to report that I found a want of care characterizing a large portion of this work. For example, the post marking the southeast corner of section 1, township 3, range 9, on the north side of the correction line, was on the south side of the road allowance, and marked for section 36, and the existing monuments do not appear to be in line. The trails at this season of the year are all in first-class condition, and there is apparently considerable traffic.

This appears to be the heart of the ranching or cattle raising country, and large herds were frequently met, both in the valley and on the uplands, and the headquarters of the Spencer Brothers, Pruitt, and Milk River Cattle company, are in the immediate vicinity, besides a large number of smaller concerns along Milk river.

The Pend d'Oreille police post is also located in the valley of Milk river, in township 2, range 8. Many deep coulées, extending both to the north and south of the river, cut the townships, giving the surface a somewhat rugged appearance, but affording most excellent shelter for cattle and horses during the winter.

Pend d'Oreille coulée, extending from Milk river to Lake Pakowki, is perhaps worthy of special comment. Apparently during very high water in the lake the outlet is this coulée. It averages one-half mile wide, and the soil is apparently a very fertile clay loam, as at the time of my visit it was producing a most luxuriant crop of blue-joint, and was, of course, a great rendezvous for thousands of cattle, and no doubt within a short time will be brought under cultivation.

Rattlesnakes were found in townships 1, 2 and 3, range 8, where we killed no fewer than half a dozen, one of them measuring five feet in length, and, strange to say, no trace of them was found elsewhere.

The best way to get into this country is by trail from Coutts, a station on the Alberta Railway and Irrigation Company's railway, or from Selby, a station on the Great Northern railway, in the state of Montana. From either place good trails lead to all parts of this country.

There is some wood to be had for fuel in the various valleys, but coal is the chief fuel, and apparently abounds throughout the entire country. Seams that have been disintegrated by weather and frost were observed in nearly all of the deeper coulées, and in one on the west boundary of township 1, range 8, where the earth and other foreign matter had been cleared to some extent, we were able to help ourselves to what fuel we required. It appears to be of the lignite variety, and is largely impregnated with sulphur.

Sandstone is abundant in the coulées on the south side of the river, and in many cases is quite hard enough to be used as building material.

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The country along the south boundaries of townships 1, ranges 8, 9, 10 and 11, is very rolling and rough, being crossed by spurs and coulées from Sweetgrass hills. The coulées were nearly all dry at the time of my visit, but springs yielding very excellent water were found on several occasions. A number of settlers are located on these coulées and cultivate the bottom lands with fair success, but general farming without irrigation appears to be out of the question.

Besides resurveying the south boundaries of townships 1, ranges 12 and 13, there was considerable retracing on each of them, so much so, that in accordance with your further instructions, I made a resurvey of township 1, range 13. The original subdivision surveys in these townships appear to have been rather carelessly performed, as lines were not straight, distances not as shown, and several monuments noted had never been constructed at all. Probably it would have been better had the resurvey been extended to township 1, range 12. The south boundaries of townships 1, ranges 8, 9, 10, 11, 12, 13 and 14, were all more or less out of position, indicating great want of care, and all the township corner posts planted in this survey were wrongly marked. Township 1, range 14, is not so rolling as the other ranges, but otherwise similar conditions obtain. This whole country, in the writer's opinion, is admirably suited to cattle raising, and is but very indifferent farming land, judging from the poor crops produced in township 1, range 13, and in three different places, where cultivation was tried on the uplands.

Milk river flows through the northeast of township 1, range 13, and waters the northern portion of township 1, range 12, thus providing water for the numerous herds of cattle to be found in this locality. Wood for fuel may be obtained in places, and with a little development work coal could be mined, as indications were seen in several coulées in this neighbourhood pointing to the fact that a bountiful supply was near at hand.

There is a great abundance of sandstone in townships 1, ranges 12 and 13, and especially in the vicinity of 'Writing-on-Stone' Royal Northwest Mounted Police post. The softer parts have been removed by erosion, leaving the rock in all sorts and conditions of pleasing and fantastic shapes, forming a very beautiful and picturesque sight. The sandstone is easily quarried, and is an excellent and abundant building material. All of the settlers with which the valley is dotted use it to a greater or less extent in their building operations for cellars, foundations and outbuildings.

Leaving Milk river, we proceeded west, to the Alberta Railway and Irrigation Co's railway, and thence northwesterly along the road to Brunton station. The country as far as the ridges is similar to that already described. After crossing the Milk river ridges, which lie from four to six miles south of Brunton, the land appears to improve in quality as witnessed by the more luxuriant growth of grass, and some excellent crops raised in the vicinity of Brunton.

From Brunton we proceeded north to Etzikom coulée, where we camped, in order to retrace certain lines in townships 6 and 7, range 17. The subdivision of these townships appears to have been done in a very indifferent manner, as shown by the notes returned of the retracements made, and I am of the opinion that the entire township would have to be retraced, to eliminate the errors. If I might be allowed, I would suggest the very great desirability of a resurvey in these two townships, as nearly every line retraced was found to be different to the returns sent in, both in chaining and azimuth.

These two townships are generally good soil, and I think will very shortly be cultivated, and form an important addition to the producing lands in this district.

Several claims have been located, but only a small amount of land, as yet, has been cultivated, but probably during 1907, the amount will be very largely increased. Coal is the only fuel. It is to be had at Stirling, a station on the Alberta Railway and Irrigation Co's line, and ten to fourteen miles distant over the very good trail following the Etzikom coulée, although one settler informed me that he knew of a seam of lignite in township 6, range 16.

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Our next work was to make an examination of the third correction line, ranges 22 to 26, and we passed through Stirling and Lethbridge en route. Stirling is the centre of a new Mormon settlement, and appears to be in a thriving condition. Here all men are brothers. From what I could learn, the settlement extending westward from this point, is in a prosperous condition, and I am credibly informed, they as good Mormons will help one another in all possible ways.

A large beet-root sugar factory at Raymond, some six miles west of Stirling, has opened up a large industry, that men, women and children of this settlement all assist in making a success.

Irrigation schemes are being pushed in all directions, and the excellent produce of all kinds, testifies to the fertility of the soil when properly watered. As you near Lethbridge, several large irrigation canals are passed, and the country assumes a still more settled aspect. Good buildings, larger stacks of grain, and more fences mark the advance of civilization.

We spent one day in Lethbridge, replenishing our provisions, horse food and fuel, and shoeing our horses, and attending to several minor repairs, and making a short call on the agent, Mr. Martin. We then started for the third correction line, and here again we found somewhat careless methods of surveying very much in evidence, and the positive instructions given in the Manual to make the line joining township corners a true line, evidently disregarded, as the line joining the monuments, on several occasions, was anything but straight.

The road allowance in one place was but fifty links in width, and was corrected and widened, as much as circumstances would permit. Only a few of the original posts were found standing along these lines, and I was informed that the same conditions existed throughout the adjoining townships. Partially obliterated pits, sometimes quite difficult to find, were generally the landseeker's only guide, causing him at times much trouble to ascertain his location.

An error of ten chains was found in the east boundary of sections 6 and 7, township 11, range 22. As no lands were patented, and the only improvements affected were plowed land and some fencing, the latter of which in any case would have to be renewed in the course of two or three years, and as the settlers would neither consent nor refuse to have the change made, I dug pits on the east boundary of these sections, in the proper positions. It appeared to me to be too bad to leave so glaring an error which might cause costly and useless litigation in the future when correction could now be so easily made.

The country along this third correction line, is fast settling up, and will in a very short time become a factor in the wheat producing districts. The soil is a clay loam, and apparently very fertile. The land has been taken up within the past three years, and even in so short a time many fine farm buildings and houses were noticed, and one hundred acre fields were seen quite often, all testifying to the productiveness and fertility of the soil. Very few quarters of available land were vacant, and all held their lands at from \$17 to \$25 per acre, when for sale at all.

Fuel is an item in the domestic economy of settlers in this region that presents a very serious obstacle. During the time of my visit in the early part of November, on several occasions I heard settlers pleading with the coal dealers in Leavings and Claresholm to let them have a little coal, and although there is an abundance in the neighbourhood, the settlers seemed unable to get it. The Black Diamond mine, east of Lethbridge, had contracts for all they could produce, and the strike at Lethbridge and a broken cylinder head prevented them from producing the usual supply. Indications of coal were observed in section 7, township 11, range 22, where a well had been sunk some twenty-seven feet, and shale having the appearance of close proximity to coal was found. Also on Rocky coulée, running north and south through township 10, range 24, some prospecting had been done, but not sufficient to strike a good seam. I was informed that about two miles north of the correction line in township 11, range 22, coal had been dug, where it was exposed very near the surface. It seems a great pity that settlers should be at the mercy of coal companies and strikes, when so much

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material is so near at hand. The development of this coal would remove a great obstacle to the complete and very prosperous settlement of this splendid tract. All the settlers we met seemed to be hopeful and prosperous. One young Englishman who had been on his claim two years, and started with nothing, had some eight hundred bushels of wheat, besides two hundred or more bushels of oats. He was living in a small shack, but felt that he was on the highway to prosperity, and the same air and spirit was noticeable all through the locality.

The road along the third correction line leads directly into Leavings, a station on the Calgary and Edmonton branch of the Canadian Pacific railway and during the time of my stay, from five to ten wagons per day, loaded with grain, passed us on their way to market. Hay was purchased from the settlers in this locality, as our horses had to be tied up, owing to a large portion of the country being fenced. What remained was eaten very closely by the cattle which are allowed to range on vacant lands. The hay was of good quality, timothy and red top, and appeared to grow luxuriantly, and the farmers in this locality would, I think, have but little difficulty in feeding their animals during the winter.

Potatoes, turnips, carrots and beets are grown all over the district, and from samples obtained appeared to be of excellent quality, and I was informed that the crops were easily raised and abundant.

The want of water is somewhat of a drawback, but most of the settlers now have their own wells that range in depth from fifteen to two hundred feet, and while some appeared to be tainted by the proximity of coal, the water is generally very good although hard.

Some complaint was heard as to the market not being so satisfactory as desired. When wheat was 52 to 54 cents per bushel in Leavings the same grade was selling for 70 to 75 cents in Winnipeg. The settler thought he was not getting his due, but no doubt continued prosperity and a united action on the farmers' part will tend to do away with this seemingly large difference.

Our next work was some retracement in township 13, range 29, west of the fourth meridian and upon completion of the third correction line we started for Lyndon P.O., passing through the town of Leavings en route. These small prairie towns all give evidence of the prosperity of the surrounding country. There are several good stores in Leavings, where supplies of all kinds can be purchased at about Calgary or Medicine Hat prices. There are also two fair hotels, a butcher shop, a blacksmith shop, livery stables, several churches and a good school. And just here I beg to remark that from Stirling, which is the point where extended settlement begins, northward schools are quite frequently to be seen, and north of Lethbridge the schoolhouse becomes quite a familiar sight.

From Leavings we followed the third correction line to the base of Porcupine hills, and from there along the old '44' trail to Lyndon P.O. which is situated right in the hills, passing en route the fine buildings of the '44' home ranch. The land along this trail is being rapidly taken up, many preferring the protection afforded here to the bleaker locations on the open prairie, and a number of prosperous looking homesteads were passed en route. A large portion of these hills is held by various cattle and ranching companies, and no doubt when their holdings are thrown open many more settlers will take advantage of the opportunity to locate in this district.

Here again I found carelessness in the original subdivision to be the sole cause of making retracements necessary. Although the country is rough and very rolling it should not be an excuse for returning chainages so different to what is actually on the ground, as a little extra time and rechainings would show the surveyor the correct distances, and remove the somewhat disagreeable necessity of admitting errors.

This entire township is very hilly. Trout creek flows along its south boundary and Willow creek along the north, and the summit or divide between the two valleys passes right through the township, and ranges from four hundred to five hundred feet above the creeks. Smaller ravines leading into these creeks cut the surface in every direction making it very rolling and broken. Willow scrub and brush was

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found in many ravines and on the northern slopes of hills, making the locality, in the writer's opinion, an ideal cattle range, and while the land is of excellent quality the very uneven surface would render extended farming operations difficult. The grass on the hills is largely of the spear or arrow grass variety, of a most luxuriant growth, and seems to be very nutritious, every place not covered by scrub or timber affording fine pasture for stock as well as shelter and water. There is a small quantity of very fine timber in the southwest of the township consisting of fir, hemlock and spruce, and apparently this supply increases as you go farther into the hills. Settlers use wood for fuel here altogether, and have no difficulty in securing all that is required, as well as fence posts and logs for stables and outbuildings. A sawmill is located some five miles west of this township, on Trout creek, and is very accessible by a good trail along the bank of Trout creek. The water is all fresh, and I am credibly informed that during the fishing season both Trout creek and Willow creek afford a bountiful supply of trout of which there appear to be at least two varieties.

Trout creek in this township is hardly large enough to make development of power profitable, but I am told that Willow creek is very well adapted for such a purpose, and has ample water and several rapids that could be developed very readily by the construction of dams.

Sandstone is readily obtainable in the southeast portion of the township in section 1, and I am informed can be taken out in Willow creek also, and apparently is a very good building material, as a number of ranchers have used it for foundations, cellars and small outbuildings.

No minerals of economic value with the exception of lignite were found throughout the season, although as noted in my report of township 1, range 13, Sergeant Gillespie of the R.N.W.M.P., has found what he believes to be petroleum, and at the time of my visit was pushing his investigations to ascertain for a certainty.

Game was very scarce throughout the entire range of my season's work with the exception of coyotes, badgers and foxes, which seemed to abound everywhere. A few antelope were seen while we were in township 2, range 29, west of the third meridian. A few rabbits and chickens were seen at intervals during the season, but ducks and geese were very scarce, no doubt owing to the great want of water in this locality.

Along Milk river, in township 1, range 13, several colonies of beaver were noticed, and although we saw none of these interesting and industrious animals the result of the previous night's work was very frequently in evidence.

Upon the completion of the retracement in this township, I thought it best to disband for the season, as the snow was already deep and the weather cold, the last move we made taking us almost the whole day to go four miles. The ground was too hard to mound whenever exposed, and apparently winter had set in, although the settlers all informed me a chinook wind would come and take away the snow very soon. However, on the 27th of November, I moved out to Mr. Erwin's in section 2, township 13, range 29, west of the fourth meridian, where I stored my outfit, and left my horses in Mr. Erwin's care for the winter. Next day Mr. Erwin took us to Claresholm, when I paid off the party and left for Medicine Hat, and thence home at once.

The question of the rights of the squatter and small settler as against the large lease holder is one that is rapidly becoming a burning issue throughout the grazing lands, and the department will no doubt be called upon before long to clearly define the rights of each. During the season we heard both sides, but the solutions are out of the surveyor's province.

During the season the outfit travelled some four hundred and twenty miles, not including travelling while at work, and generally the trails were in good condition, and horse feed abundant in the vicinity of our camps.

Some three hundred and fifty miles of line were surveyed or retraced, monuments restored, or new ones constructed. The temperature was noted each morning at 7 A.M., and a record of the same appears in my diary together with a short note on each day's weather, &c.

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Observations for azimuth and time were taken at every opportunity affording a constant check on all work performed.

The timepiece, Watt transit and four chain steel tapes, all proved to be well adapted to the work required. The transit being especially well thought of, and on clear days, not too windy, the writer had no trouble in finding Polaris at noon, and observations were frequently taken during the dinner hour.

The four chain tape was also found to be of excellent quality and by using the clinometer the roughest country is quickly and accurately measured.

I furnished my chainmen with plummets which were used throughout the work, as I find this method preferable to a drop pin.

The weather was generally very favourable for the prosecution of survey operations. Only three days were lost from rain and one and one-half from snow during the entire season. The high winds that prevail in southern Alberta are somewhat annoying, and require the surveyor to exercise the utmost vigilance to keep his line straight and his chaining accurate.

In closing my report, I wish to express my appreciation of the services of Mr. Paul B. Street, of Toronto, who always performed any part of the work assigned with ability and cheerfulness.

I have the honour to be, sir,

Your obedient servant,

A. H. HAWKINS, *D.L.S.*

APPENDIX No. 25.

REPORT OF ERNEST W. HUBBELL, *D.L.S.*

RESURVEYS AND INSPECTION OF CONTRACTS IN THE PROVINCE OF SASKATCHEWAN.

OTTAWA, January 22, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report of my survey operations in the province of Saskatchewan during the past season.

In compliance with your instructions dated March 30, 1906, I left for Prince Albert on April 17, arriving there late Saturday night, April 21.

On Monday I drove to Mr. J. E. Pollock's ranch, ten miles distant, where my survey outfit was stored for the winter. I returned the following day with both my horses and outfit, the former looking as if they had not been overfed during the winter. My organization station being at Craik, one hundred and seventy-seven miles south of Prince Albert, I considered it more economical to convey my outfit there by rail. Engaging a box-car I loaded my outfit and horses and arrived at Craik on the 27th, where we immediately pitched camp and with my whole party I was under canvas that night.

This small but thriving town of Craik, seventy-three miles north of Regina, is situated on the Prince Albert branch of the Canadian Pacific railway (now the Canadian Northern), and has a population of about three hundred, with many substantial buildings, including two large grain elevators, several churches, two hotels, numerous stores and two lumber yards; it is a distributing point for immigrants and land seekers who wish to look over, purchase or homestead land. It is the centre of a district extending easterly as far as Last Mountain lake (distant twenty-five miles)

The next two days we occupied in obtaining our provisions and making supplies etc. and on the 12th we started for Crank and travelling on a good trail as far as we could we camped there for the night. During the day we travelled westerly, making about fifteen miles. The trail was the way, which immediately through a mountain range now rapidly being taken up by settlers. The work of the new settler was very much in evidence, predominating. Some conjecture that the trail may be obtained from the trail which we travelled on this same trail all day and that the work was from almost any part of the trail. The settlers in this neighborhood

Land in this area is being used for the growth of crops and is considered to be of high value.

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additional machines are in this part of the country the above rate, it is presumed, will be reduced by one-half or thereabouts. However at present everyone is anxious to have his threshing done as soon as the grain is ripe, for at this season of the year, frost is not unknown. The consequence is that the number of machines being limited the demand is great and this accounts for the high rate per bushel. From the time of seeding to that of harvest, in the case of wheat, is from one hundred and five to one hundred and ten days, much depending upon the amount of rainfall and heat. Horses and cattle are obtainable from the Hitchcock-Ferguson ranch or from Walstad's ranch, both of which are in this section of the country. Horses cost about three hundred dollars per team and oxen about one hundred dollars per yoke; a good cow costs from forty to fifty dollars; wagons are worth seventy-five to eighty dollars, sleighs twenty-eight to thirty-two dollars and double harness twenty-seven to thirty-eight dollars a set.

Farm produce commands a high price; potatoes when procurable sell for one dollar to one dollar and fifty cents per bag, butter thirty to thirty-five cents per pound, milk seven cents per quart, eggs twenty to thirty-five cents per dozen, &c. Hay is rather scarce, but obtainable from Qu'Appelle valley and in a few of the large hay sloughs. In addition the settler cuts and uses the short prairie grass, commonly known as wool-top which is more nourishing than the hay taken from the sloughs and is generally preferred by stock. Hay usually sells at from eight to twelve dollars per ton, but it is not unusual to pay one cent per pound. The price varies according to locality and quality. A considerable amount of wheat straw is used by the farmer for his stock. In fact many cattle get little else during the entire winter and thrive very well, being in good condition in the spring.

Well beaten trails pass over all this section of the country, connecting with the nearest towns on the main line of the Canadian Pacific railway to the south and on the branch line of the Canadian Pacific railway to Prince Albert to the east. The Canadian Pacific railway are now constructing a branch line from Moosejaw to the Elbow and when finished it will not only increase the value of the land, but greatly facilitate transportation, which the country urgently needs to meet the requirements of the great influx of settlers.

Building material and supplies are procurable in the small towns at moderate prices and are freighted to the homesteads of the settlers by means of horses and oxen. For fuel, the settler burns coal, generally. This is obtainable at most of the railway stations on payment of seven to nine dollars per ton. A little wood is to be had from some of the coulées which extend down to Saskatchewan river, also some wood of small dimensions is obtainable from a belt of sand hills in townships 23 and 24, range 3. However this belt is being rapidly depleted to supply the needs of the settlers for both building and fencing purposes, and in a year or two, perhaps less, wood of any description will not apparently be procurable, except at the railway stations. In this connection it is unfortunate that there do not appear to be any indications of coal or lignite veins in this section of the country.

Good drinking water is rather hard to obtain in many places and until wells are extensively dug this will continue to be a slight detriment to this otherwise fertile portion of the province of Saskatchewan. There are very few sloughs or creeks in which the water is palatable, therefore wells are being dug, and water is usually obtained at a depth of from twenty-five to seventy-five feet, although in many instances the supply is limited and often alkaline. Owing to the unusually small fall of snow and the limited quantity of rain for the past two years, most of the sloughs and many of the creeks shown on the maps as containing water have now little or none. For instance, Qu'Appelle river is entirely dry in many places.

As a rule, the soil in this section of the country is inclined to be light; it follows that a considerable amount of moisture is necessary to ensure good crops and vegetation. The system of 'boring' is now adopted by many of the settlers, and doubtless in a year or two good water will be plentiful. There are several excellent springs

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in the vicinity which have an apparently inexhaustible supply of pure fresh water, and naturally these are a great boon to the settler.

From personal experience while residing in this part of the country during the greater portion of the last two years, and from information obtained through old settlers, I should say that there are no summer frosts that are likely to do harm, although there may be an occasional hailstorm. On the other hand the heat during the summer months is intense. Vegetation usually commences about April 25 or May 1. At the end of April, with the disappearance of the snow spring ploughing commences. May is an unsettled month, one day it may be 100 degrees in the shade, the next cold and raw, accompanied perhaps by a flurry of snow. Usually there is considerable rain during the months of May and June, and the next few months are dry and very hot, with an occasional thunderstorm. Last season we had, during the month of May, rain on fifteen different days, during June twelve days' rain, while during July and August the weather was very hot and a few thunder storms occurred. The first slight frost was noticed on August 25, but it did no injury to the crops. Throughout this section of the province (about seven hundred square miles) we did not perceive any indications of coal or veins of lignite, nor in fact minerals of any description.

On the tops of the numerous ridges boulders are more or less frequent, and doubtless, as has been done elsewhere, will be utilized by the settler for building purposes. I understand they make substantial, durable buildings, which give general satisfaction. Owing to the scarcity of lumber, many of the settlers build their houses out of sod. These sods are first ploughed in furrows, then cut into dimensions of 2½ feet x 14 inches x 3 inches, and laid on each other, similarly to the placing of bricks, and with the addition of a few supports on the inside make a very comfortable warm house or stable; if they are well made and lined with lumber on the inside they will last for years. Speaking in general terms of that portion of the province of Saskatchewan extending from Prince Albert in the north to Willowbunch in the south, from Melford in the east to Swift Current in the west, covering an approximate area of thirty thousand square miles, twenty-five thousand may readily be classed as excellent agricultural land; of this portion, where I have been engaged in surveying operations for the past two years, I may say, having travelled over it during that time more than once, that it is a beautiful extent of uninterrupted farming country, with vast unknown resources which one is unable to estimate with any degree of accuracy. It is being rapidly settled by a superior class of immigrants, many of whom might well be designated Canadian-Americans, men born in Canada who emigrated to the United States, lived there many years, married, became possessed of property, and being persuaded that they had now an excellent opportunity to improve their positions have sold out, returned to Canada, bought land and taken up homesteads in the great West.

When one contemplates the vast unknown possibilities of this country where as yet everything is new and in the experimental stage the future prospects are overwhelming and as a crude estimate, I venture to state that in the above defined limits, for every square mile now under cultivation, there are two hundred square miles of virgin soil. There is a considerable portion of this area which cannot rightly be designated strictly agricultural, but which is ideal for stock raising, more especially those portions adjoining Saskatchewan river, that portion comprising various ranges of sand hills, and a large area in southern Saskatchewan bordering on the Notukeu and Wiwa creeks and also on Wood river. This latter portion is a paradise for ranchers, and in it a number of ranches are now located, one of the largest of these being the 'Turkey Track Ranch,' situated about thirty-five miles southeast of Swift Current and possessing about sixty thousand head of stock. I passed through one enclosure in connection with this ranch, where there were four hundred Hereford bulls.

To a great extent the settler and rancher are dependent the one on the other, and views expressed by both to me were to a certain extent reciprocal, the two occupations being so closely allied.

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It struck me that it might be advantageous (if possible) to set apart certain portions of the above mentioned lands for stock raising as most of it is entirely unfit for agricultural purposes and practically valueless to the farmer, while consisting as it does of broken hilly land, huge ravines, gullies and coulées it would afford excellent protection to the stock during cold weather. The original survey of the townships in this vicinity was fairly well executed, and with but few exceptions, the position of the original survey monuments were easily discernable, more especially to the practised eye. When these surveys were made in 1883, quarter section posts were not used in this neighbourhood (there being no wood to make posts) the only distinction between the mounds erected, was an iron tube placed at the section corners, upon which was placed a square tin with section numbers stamped thereon, these tins having in most instances disappeared, there was no distinguishing mark left to show a settler or prospector his exact locality. As a result much time was lost, it not being infrequent for a settler to squat on the wrong quarter section, and confusion naturally followed.

It is imperative that proper distinguishable marks be at all section corners at least and I respectfully recommend that all the townships surveyed in 1883 and 1884 be re-marked. I may say in connection with my season's surveys that I destroyed a number of old river lot mounds, and that the greatest number of miles surveyed in one day was fifteen. The weather during the whole season to November 15, was all that could be desired for surveying operations, and the trails were excellent.

On September 28 I left Craik to examine and, if possible, to correct some errors in the vicinity of Last Mountain lake, a beautiful sheet of water, fresh and pure, sixty miles long, and averaging two miles in width; it is also quite deep. Excellent fishing and shooting is afforded the lucky sportsman, who is fortunate enough to spend a few days on its delightful waters. I had the pleasure of hauling in a whitefish that weighed eight and one-half pounds; pickerel and jackfish are very numerous, and in fact quite a large fishing industry is carried on here. Also the many islands afford good breeding grounds for ducks and geese. The natural inference regarding this beautiful and attractive lake is that it forms an ideal summer resort, in fact, even now, on almost any day, numerous gasoline launches and smaller craft can be seen cruising on its clear waters.

After I had completed the work here satisfactorily, we moved to township 27, range 24, where I did some more correction work. It was here that I verified an error in the bearing of a meridian of $11^{\circ} 46'$ —which had caused considerable dissatisfaction among the settlers, and upon which I duly submitted a detailed report to you. I then moved to township 29, range 26, and did some work there, afterwards returning to Craik, following a well beaten trail which led through a beautiful, open, undulating and well settled district. In every direction threshing operations were being conducted; I was informed that the average yield of wheat was twenty-three bushels to the acre. The farmers haul their grain from here in large wagons, specially made and containing one hundred bushels, to the elevators in Craik.

Arriving at Craik I completed some correction work in township 24, range 28, and then proceeded to township 19, range 29, and surveyed some meridian outlines and their connecting chords and also did some correction work. I then retraced both sides of the road allowance between townships 18 and 19, range 29, where a large error exists, also the meridian outlines adjoining the correction line, and forwarded you a detailed statement as to how matters might be rectified. The great trouble lies with the land already patented, and settlers who gain by an error in survey are very loath to agree to any change in the original survey monuments. On October 18 I left here for Swift Current to inspect certain contracts south of the town, where after a tedious journey through hilly country with few trails we arrived on the 23rd. While on this trip we passed through many small towns on the main line of the Canadian Pacific railway, and it is really astonishing to note the growth and progress made during the past year, besides the increased value of land and property.

At Swift Current where I remained a day the population has doubled during the

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past year, and property has increased in value amazingly; everybody appeared to be working, and apparently there was plenty of work for everyone. In all these towns and all through the west real estate appears to be the password. From Swift Current I travelled southeasterly to township 11, range 12, where I carried out your instructions, and on November 1 moved camp easterly about ninety miles to inspect certain contracts in that vicinity. My route lay along the valley of Notukeu creek, a fine stream of fresh water having an average width of fifty feet and quite deep, with fairly high banks. The country passed over is a continuous stretch of open prairie, with an occasional clump of willows on the banks of Notukeu creek. The surface is generally rolling, but quite hilly on the east side of Wood river which is a fine stream of fresh soft water and has considerable wood growing on its banks, suitable for fencing and firewood. In fact this is the only firewood in this section of the country which is unsurveyed and practically uninhabited, except by a few ranchers. The country is admirably adapted for ranching. The soil is sandy loam and no doubt as fertile as other sections of the country with the same kind of soil. We passed several large bodies of water, the largest being Johnston lake and the Lake of the Rivers, the water of which unfortunately is unpalatable. Hundreds of antelope were seen daily during our travels, occasionally jumping deer, large prairie wolves, foxes, coyotes, badger, also prairie chicken and countless thousands of duck, and geese of all varieties. One has to be an eyewitness to the flight of these wild fowl to the southward during the fall to even dimly conceive an estimate of their numbers or the vast quantity of food required by them.

On November 15 while in camp near the Lake of the Rivers, we were prevented from completing our work owing to an unexpected blizzard, which raged for four days and four nights, covering the ground with snow from three feet deep on the level, to twelve feet deep in the ravines, most effectually covering all fodder for horses and making wheeling almost impossible. As we were fifty miles from wood, and the weather extremely cold, I considered it not only advisable but compulsory to make the nearest town which was Moosejaw, distant about seventy miles. Owing to the unusual depth of snow, I was obliged to leave behind most of my outfit. Our journey to Moosejaw was trying, cold and most strenuous, as we had to break the trails for the horses which soon gave out as a result of being half the time down in the snow, which was always even with the wagon box. Having but little wood we felt the severe cold very much, as provisions could not be properly cooked, nor could we get thoroughly warmed, everything being frozen. We arrived at Moosejaw on the 23rd, both men and animals thoroughly exhausted, but thankful. Here we were told that this blizzard was unprecedented, and besides the loss of many cattle, several men were reported missing, in fact, subsequently, a man and his horse were found frozen to death within a few hundred yards of where we had passed.

After resting a few days, I hired two sleighs and sent back my men and horses for the remainder of my outfit. They, though better equipped and more prepared, had an exceedingly rough time, but brought in the outfit which we stored for the winter at Mr. A. W. Annable's ranch, Moosejaw.

Before closing my report, I desire to bring to your notice, the destruction of numerous mounds and pits by many settlers who, when ploughing, carelessly ignore the survey monuments and plough or harrow them over, thus filling the pits and obliterating the mounds. I suggest that some stringent method be adapted to prevent further destruction of these monuments, which the government is endeavouring to perpetuate for the settler's benefit, and which entail the expenditure of large sums of money. I also wish to point out that there is a great necessity for a properly conducted ferry to cross Saskatchewan river at a point in the vicinity of Log Valley. Considerable risk is run and much time is now lost in crossing, the traveller having to either swim his horses and ferry his wagons and belongings across with the best means at his disposal, or travel around by the Elbow, thus entailing an extra journey of from sixty to eighty miles.

During the past two years an epidemic of glanders has been prevalent throughout this section of the country, in fact so much so that the government sent veterinary

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surgeons to the various ranches to examine and report thereon, with the result that many horses were shot, and the disease was practically stamped out.

While in Moosejaw, I had the pleasure of being driven to and shown over and through the Moosejaw nursery, situated about a mile to the south of the town and located in a most beautifully sheltered spot, comprising about ninety acres. It is surrounded by high banks through which runs Moosejaw creek, utilized by the Company as a water supply and for irrigation purposes. Thousands of young trees of every description, and endless varieties of shrubs are kept for experiment and sale. Vegetables of all kinds are grown, and in the four large green houses (of the latest improved designs) flowers of every variety and green vegetables are always being cultivated. Although still in the experimental stage, the nursery has proved profitable beyond all expectations, and the supply being not nearly sufficient to meet the demand. I write the above as an illustration of what can be done in this country of surprises, as many people are under the impression that vegetables and flowers cannot be grown successfully during the winter months.

In conclusion, I wish to record my appreciation of the services rendered by my assistant, Mr. R. Oscar Spreckley.

I have the honour to be, sir,
Your obedient servant,

E. W. HUBBELL, D.L.S.

APPENDIX No. 26.

REPORT OF A. W. JOHNSON, D.L.S.

SURVEYS IN THE WESTERN PORTIONS OF THE RAILWAY BELT.

KAMLOOPS, B.C., February 5, 1907

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa, Ont.

SIR,—Having sent instructions to some of the men to meet me at Lytton, I left Kamloops on February 19 for the Nicola.

My last year's aneroid elevations on the railway belt did not check out well, and I wanted to get a reliable height for my starting point on Spius creek. As a railway has been built up the Nicola valley since I was there, this was easily got, and I went on to Lytton, where Mr. Irwin, the Indian agent at Kamloops, was waiting for me. He wished to find the position of certain improvements near Indian reserve No. 27. Mr. McKenzie, agent of Dominion lands, of New Westminster, came up a day or two later, and he helped me with the final adjustment of lots 1460, 359, 1 and 2. The last two had been surveyed in the Caribou days, but all monuments were gone, and I had to survey them again, conforming as much as possible to the old notes and sketches. In my opinion it is a great mistake to use wooden posts at all, whether at quarter-section corners or any other. Even a cedar post will not last more than forty years though left absolutely undisturbed, and they will not stand much knocking about after twenty. I would also suggest that the iron posts supplied should be of better quality. Some of these I have had this year were so rotten that a man could break them with his hands. The ideal monument for British Columbia is a stout iron post and a pile of heavy stones.

Pits can be traced for perhaps ten years if they happen to be dug on the level and left quite undisturbed by stock, whereas a stone mound of regulation size, es-

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pecially if made of large stones, is practically everlasting, and I have never seen one so much disturbed in this province, even by stock, that there was any difficulty in identifying it.

On the 27th most of the party went to Hope, while I went up the Fraser with one man to put iron posts in at some of the section corners near the railway belt limit, my supply having run out during the previous fall. This took a couple of days, and we then followed to Hope.

In 1902, I made a preliminary survey of this townsite, and left iron piping at some of the main street intersections. The place was surveyed originally in 1861 by the sappers and miners who built the Caribou road, and wooden posts were put in. Nobody knew of the existence of any of these original marks, and though I worked for months in the townsite it was not until the survey was almost complete that I succeeded in finding one. It tallied very closely indeed with my own work, which was based on old fence lines and such old buildings as were reported to stand on lot lines. As there are two or three people in Hope who have been in the town since 1860, I was able to get fairly good evidence, though no really authentic starting points. The Hudson's Bay company once cleared practically the whole townsite to grow feed for their pack trains, but it has been allowed to grow up again, and is now covered with dense bush except where the few houses are.

It is patiently waiting for a railway, with the advent of which a tourist traffic is certain to spring up, for a pleasanter spot for a summer holiday could not well be found. There is splendid trout fishing close to the village, mountain climbing 'ad nauseam,' and big game shooting for those who like to take the risk of climbing round giddy corners after goat, or the trouble of forcing their way through the interminable vine maple and huckleberry brush to the high open slides, every one of which is the feeding ground and exclusive property of some bear.

Besides making the resurvey of the townsite itself, I put monuments in at several of the corners of surrounding lots, and as far as possible made the survey between Hope and Silver creek rigid. I have spent a great deal of time in and near Hope, and have had the invaluable assistance of Mr. McKenzie in every way he could afford it, and I feel convinced that with the proper data available, and bearing in mind that all landowners who have seen the survey are satisfied, it would be a waste of time and money to go over the work again.

On April 16, we went down to Sumas lake by canoe. While here I made a correction in my resurveys of lots 225 and 226, and as soon as possible returned to Hope, picking up a few horses on the way. I also sent to Nicola for ten horses by a man who was buying some there for himself, and began a traverse of the Similkameen trail before they arrived. On the way up this trail we ran a couple of section lines at what is known as Lake House, or Beaver Lake, and after reaching the limit of the railway belt ran along it as far as my last post in 1905. My tie came out exceedingly well to all appearances, but I found afterwards that there were two mistakes, equal and with opposite signs that neutralized each other, one on the traverse up the Similkameen trail, the other somewhere on the railway belt limit of last year. Therefore in September I came back and re-ran this part of the limit. From the Similkameen trail southward the belt limit takes to the mountains in earnest. The first half mile leads up a two thousand feet precipice, and when we moved camp the only possible place to get up the mountain was two or three miles down Skagit river. We camped three thousand feet above the valley, arriving in small and very much scattered detachments, with in many cases much smaller packs than were gaily strapped on in the last camp. As tents were among the things thrown away, it was unfortunate that it should rain that night, and there were some very unhappy men around the bacon and beans next morning.

The mountains are so precipitous here that I had to do a good deal of triangulating. Up to a height of five thousand feet above the sea they are covered with dense balsam forests, but the wood is soft and full of knots. Up to six thousand

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feet there may be odd clumps of dwarf balsam or juniper bushes, but I think that six thousand five hundred may be considered extreme timber line. There is practically nothing after six thousand.

The railway belt limit keeps very high, in fact, runs over the top of Marmot mountain nearly seven thousand one hundred feet high. It goes down into thick balsam again along the north boundary of township 2, which is parallel to Marmot creek, and then gradually works up on to Silvertip mountain, which is the highest and most imposing mountain north of the international boundary in this district. According to my aneroid, checked by vertical angles read by transit on other known elevations, it is eight thousand seven hundred feet above the sea. The north side is inaccessible and two small glaciers are perched in the only place level enough to stay on. When I say inaccessible I mean from the ordinary human being's standpoint, not from that of a full-fledged member of the Canadian Alpine Club. I have tried it from that side with an Indian, who had a marvellous head for heights. We persevered until we found ourselves sitting on a knife edge with nothing at all on three sides of us. As far as we could see nothing but a balloon would take us up to the top. When you come to think of it an air-ship is the solution of the surveying problem in British Columbia. You could work for miles round one permanent camp and above all things there would be no packing. The south slope of the mountain is comparatively easy, and the view from the top, magnificent, but you wonder where the land is. For a hundred miles in all directions there seems to be nothing but rock and ice. The slides below the glaciers are very steep and covered with dense vine maple and cypress so dense that it was very difficult indeed to force your way through with a pack. We took our bundles straight across one of these slides and tackled the opposite ridge. Unfortunately we struck it at a very bad place and the brush was so thick that we could not see anything ahead. This was the worst pack I have ever had. The climb itself was insignificant, some eighteen hundred feet or so, but with sixty pounds on your back you have difficulty in negotiating corners that are comparatively easy when travelling light. Twice we had to unload, climb into positions over one another's heads and with infinite care pass the packs up from man to man. Most of us did at last get up, but two of the stragglers did not turn up till night, and one man offily got in next morning. Naturally enough he was the cook. When we got off Silvertip we were in the valley of Klesilkwa, which is separated from Silver creek valley by a low pass, about two thousand feet above sea level. I took the belt limit across this valley and ran parallel again for three miles along a mountain composed of solid granite. There are two miles of old rock slides with huge granite boulders, from the size of one's head to that of a house, requiring only a little dynamite to furnish the finest building stone I have ever seen. There are hundreds of thousands of tons of it that do not even require quarrying.

The Klesilkwa side of the pass is level and very swampy. It averages half a mile in width and there is land enough for some settlement when the timber has been taken out. This is mainly cedar and hemlock.

On the Silver creek side of the divide the valley narrows down and is not more than a quarter of a mile wide in most places. There is fir here besides cedar and hemlock, but not much land.

I ran a series of section lines down this valley as far as Silver lake, and connected with Hope by triangles over Hope mountain. I made this survey because there was an application for land at the south end of Silver lake, for the purpose of raising cattle. I do not think I have seen anywhere in the world a more unsuitable or hopeless place for raising cattle in. Dense crab apple and willow thickets grow immediately around the lake at its south end, alder and cottonwood along the creek, and the rest of the valley is covered with the densest growth of cedar, fir and hemlock. There is not a stalk of natural food and no range on the mountains which are precipitous, and only suitable for mountain goat.

When I tied on to Hope I found a mistake which was located during the following

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week, and I left Mr. Weld with a small party to make necessary corrections. I should not like to send this report in without saying that Mr. Weld was a very great help to me this year. We had a difficult party to handle, and the position of assistant is not at all a pleasant one. In spite of these facts he finished the corrections on time, and I doubt whether many men under the same circumstances would have finished them at all. While these corrections were being made I took the rest of the party and worked over the two ranges separating Klesilkwa creek from Chilliwak lake.

The first of these ridges is slightly over seven thousand feet and the second not much more than six thousand. Both of them were covered with huckleberries and blueberries and as a result bears were very numerous, especially as the above berries are a failure in other parts of the province. These bears were a real hindrance to the work, for the Indians would not go away alone without a rifle, and in one case refused to cross a valley at all. I laughed at them for a long time and occasionally went ahead myself to show them that their fears were groundless. However, one night while coming down a mountain side to supper with one of the Indians, we ran across a big bald-faced she-bear and cub. They were directly in our way, so I shouted to scare them off. It did not have the desired effect at all for the old bear immediately turned and charged. I think we both had pocket knives, but they did not seem very comforting so we fled. She may not have come very far, we did not stop to see, but she did not catch us. I think it is better to let bald-faces and grizzlies severely alone if you are unarmed.

There are goats on the highest ridges and plenty of marmots or whistlers as they are called here. The Indians call them the whistle pig.

The descent into Chilliwak lake was down very steep smooth rock at first, so steep that it was out of the question to put the section corner in.

We joined the pack train on the lake at Depot creek on August 11. The packers had just finished building a canoe for our use while there. Here also was a party working on the international boundary. For a week I worked from this camp, and then packed clear to the top of the ridge on the west side of the lake.

The belt limit went over some very bad country west of the lake before reaching the first ridge, country comprising ravines, rocks, precipices and, slowest of all, 35° slopes covered with dense balsam. Once out of the timber I put most of the work in by triangulation, because most of it lay over inaccessible rock.

On August 24 I got down to the international boundary, and measured westwards by means of triangles. The bases were exceedingly short, but I took great care with the angles and on the 28th tied on to a post I set four years ago.

There was little or no game on the ranges west of Chilliwak lake. There appeared to be no feed. There is no agricultural land between Silver creek and the international boundary, except a little on Chilliwak river and at the south end of the lake. A little good cedar and fir may be found around the lake, but the great bulk of the timber is knotty balsam, which as far as I know is no good for anything but firewood and second rate pulp.

Minerals are worked to some extent both in Slesse creek and Middle creek and rumours are heard from time to time of big veins between Skagit river and Chilliwak lake. It is probable that at no very distant date the lake will be a summer resort. The fishing is very good, the scenery of course gorgeous and there is nearly always a sailing breeze.

It would be easy to build a good wagon road up to the lake which then could easily be reached in a day from the town of Chilliwak.

On September 10 we began work on the correction of the railway belt limit from the northeast corner of section 13, township 3, range 23, to the last post I put in last season. It rained a great deal while we were here and the country was very rough indeed, so rough that we had some very uncomfortable moments chaining. A mile on a map looks such a short distance and so easy to chain that people who have not scrambled painfully up a rock with a chain tied to their belt with a long hard drop coming

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if they let go cannot realize what an enormous distance a mile sometimes is on the ground.

From Hope I sent two men back to Kamloops with the twenty horses that comprised the pack-train. They will do better in the upper country than at Sumas where they were last winter. At least they cannot possibly come out thinner in the spring. I was fortunate in my two packers. I doubt whether they could be beaten in British Columbia. One of them I left in charge of the base all summer. It was his duty to see that everything I needed was moved forward into valleys that the belt limit crossed. This left me at liberty to push the flying camp forward on line, because I was always morally certain that when I dropped down for supplies I should find him in the desired spot.

Before leaving this district I ran the boundaries of lots 5 and 6, near Hope, which were in doubt, and on the 22nd moved down to Agassiz by canoe. After a couple of days work in section 28, township 3, range 28 I got word that some work at Sumas was very urgent and I moved down at once by canoe to the south end of Sumas lake in township 19, east of the coast meridian. Nearly all the land around this lake was surveyed thirty or more years ago, and as it is covered every year by water, the old monuments have in most cases disappeared long ago, so that it is extremely difficult to do anything with it, but I think that what few corners I did re-establish are as near their original positions as is possible to put them now. While here I did some work of the same nature on the upper Sumas Indian reserve and on lot 227, group 2. I also made a small traverse in section 18, township 20, east of coast meridian.

On October 11, I went up to Lytton with Mr. Weld and one man. We did a few days work here on lots 1 and 2 and in section 35, township 14, range 27, west of the coast meridian and then I took a couple of weeks holidays, partly for my own ends (I wanted a grizzly and got one) and partly to get some idea of how to tackle the country between Harrison lake and the Fraser, where I shall be next season.

On November 6 I went down to Agassiz again and next day continued the work on islands in the Fraser that I had left when asked to go to Sumas. Besides this there was a good deal to do around the village itself on lots 49, 19, 10, &c. In this I had the assistance for a day or two of Mr. McKenzie, who knows a great deal more about the land in the New Westminster district than anybody else and we were able to do a good deal of resurvey work. I tried to find posts in section 5, township 4, range 28 up Maria slough, but was unsuccessful, so I wrote for the old field notes and paid the men off for the season, getting back to Kamloops on December 4.

The season has been in many ways remarkable. While at Hope, in March and April, the weather was glorious, which is unusual at this time of year. May and June were wet, but July, August and the first part of September were finer than anything I have seen in this district. Had it been otherwise the work would have been much more unpleasant even than it was. We seldom used tents, but slept out under the stars, and the fine weather enabled us to carry fewer clothes than usual, which is a great point when packing. If I had not had a nucleus of men who had been with me for years and who did not like to see me left in a hole, I should probably have finished the work with Mr. Weld and a party of two. As it was we left Hope seventeen strong and came off the international boundary with nine. Some had cut themselves, some were ill, but most were sick of packing. We had three months mountain packing with little intermission, moving camp on an average three times a week, and men will not do it if anything else at all is to be had. It did not improve matters when we got down to the south end of Chilliwak lake and found men on the point of leaving the boundary survey because there had been no fresh vegetables for three whole days. We had potatoes twice in three months.

The fall was wetter even than that of last year, which is saying a great deal, and we had several days when it was out of the question to do any work at all.

I have the honour to be, sir,

Your obedient servant,

ALFRED W. JOHNSON, D.L.S.

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APPENDIX No. 27.

REPORT OF J. A. KIRK, D.L.S.

SURVEY OF PART OF THE NORTH BOUNDARY OF THE RAILWAY BELT IN BRITISH COLUMBIA.

REVELSTOKE, B.C., March 14, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour in accordance with my instructions, to submit the following report of my survey to establish the north boundary of the railway belt at Blaeberry creek in the province of British Columbia.

The survey consisted of two traverse lines run from the northeast corner of section 20, township 28, range 22, west of the fifth meridian up the valley of Blaeberry creek to the objective point, a distance approximately of twenty-five miles. My report may therefore be appropriately styled 'A report on that part of the valley of Blaeberry creek within the railway belt.'

Blaeberry creek rises in a large glacial area, crowning the divide of the Rocky mountains at about 117 degrees of west longitude. It flows southerly for about twelve miles and enters the railway belt at the north boundary of section 10, in township 31, range 20, west of the fifth meridian. It continues southerly and southwesterly through ranges 20, 21 and 22 to its confluence with Columbia river in section 30, township 28, range 22, a distance of between twenty-six and twenty-seven miles.

The west side of the valley is paralleled by a range of mountains that rise in lofty and picturesque peaks, broken only by the narrow valley of a stream which rises in the glacial fields on the divide and flows southwesterly to its junction with Blaeberry creek at a point about three-quarters of a mile south of the boundary of the railway belt. As this stream materially increases the volume of the Blaeberry, it may appropriately be designated the 'west fork.'

On the east side a ridge runs parallel to Blaeberry creek from the north boundary of the Belt, southerly for about six miles. The flanks of three ridges bearing southeasterly constitute the east side of the valley between this point and the valley of the Columbia. The streams flowing through the three valleys thus formed comprise the tributaries of Blaeberry creek from the east. The middle one I have named the 'east fork,' as it is larger than the other two together, and contributes to the main stream nearly if not as much water as the 'west fork.' The discolouration of the water in the summer shows that the 'east fork' and the stream to the south of it are fed by glaciers.

Several small streams rise on the faces of the mountains on either side of the valley and from springs along the bordering flats, and these in many cases disappear by sinking under the surface. The valley is naturally divided as to its physical features into three parts, which for convenience of reference, I have named the upper section or gravel flats, the central or rocky section, and the lower or bench land section. My description will begin with the central or rocky section.

Central or Rocky Section.

A series of ridges which cross the valley and unite the mountains on either side, extend southerly for about five miles from a point about a quarter of a mile above the mouth of the 'east fork.' Through these ridges, which consist of a species of soap stone soft enough to be scratched by a finger nail, the creek has cut a channel from

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fifteen to seventy-five feet in width. In places the vertical walls of the canyon thus formed are over a hundred feet in height. Through this section the creek is a succession of rapids, as the total fall is probably not less than two hundred and fifty feet. Further reference to this section is made in the paragraph following the description of the upper section.

Upper Section.

Proceeding up stream from the canyons, the bottom of the valley is a gravel flat, on which, speaking generally, there is a light covering of soil that increases in places to several feet in depth. It seems evident that the rock at the entrance to the canyons has not been cut out as low as the grade of the rock forming the true bottom of the valley above, and that the dam thus formed holds the gravel forming the flats as in a basin. The creek meanders with a swift but uniform current in a channel that is constantly shifting during times of high water. An expanse of gravel bars has thus been formed that is constantly increasing in width by the erosion of the banks.

The valley averages about half a mile in width. The mountains forming its bounds have the usual features of the Rocky mountains: The summits are destitute of vegetation, and often rise in sharp ridges and peaks of fantastic outline. The faces of the hills are frequently a succession of slides, while the slopes at their bases are composed of sharp-edged rocks that have fallen from higher levels. These slopes are usually covered with soil. The soil on the west side generally reaches higher levels and is of better quality and greater depth than on the east side.

The country is covered with a growth of spruce, cedar, fir, hemlock and pine, spruce predominating. On the lower levels of the mountains and on the flats along the shore of the creek, there are belts of timber that will run from twelve to twenty-four inches in diameter at the butt end. The cedar is usually hollow and not large enough to have sufficient sound wood to make it valuable. The other woods are generally of good quality, but as is common in this section of the country, the trees contain but a small percentage of high-grade or clear lumber. I estimate that there is between three and four square miles carrying from twenty-eight to thirty million feet log scale of merchantable timber in this section. In addition to the timber described, the country is covered with a smaller growth admirably adapted for pulp wood.

This section is remarkable for the absence of traces of forest fires. If my conclusions are correct, this is due to the following causes. During the summer months, while the country in the vicinity of Golden is parched for want of rain, storm clouds are often seen approaching from the west which turn to the left at Mount Moberly and continue up the valley of Blaeberry creek. Along the upper reaches of the creek these clouds precipitate their moisture. This phenomenon probably prevails during the winter when the precipitation augments the glaciers in which the creek rises. The greater portion of the rain falling on the rocky surface of the summits unwatered by the Blaeberry, does not form into creeks, but descends rapidly to the debris at the base and percolates through the soil, thus keeping it constantly moist, while the flats bordering the creek, while not swampy, as a rule are full of springs from the same source. This feature is an important point in connection with the area I am now describing as it appears to thoroughly protect the forest from fire. It is true that burnt trees are to be seen high up on the mountain side that have grown on small ledges of rock, but this fact accentuates my point, as in such places the moisture rapidly drains off.

Central or Rocky Section—(Continued).

In the section cut by canyons the gravel flats are replaced by bench land through which ridges of rock protrude. The country has been overrun by fire and only isolated patches of a large forest remain. The precipitation decreases as the Columbia valley is approached, while the drainage from the mountains and local rainfall, sinks rapidly through the porous, sandy and gravelly soils of the bench lands, leaving the surface

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dry, and in a favourable condition for the spread of fire. Young forests of pine, spruce, &c., are covering the brulé.

The trees are small yet, but in time if protected they will have a commercial value. There remains near the southern part of this section about a third of a square mile of fine spruce, balsam, &c., estimated to contain about five million feet, log scale. Along the banks of the east fork there is a fine body of spruce and balsam, but I had no opportunity to go through it.

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From the foot of the canyons the stream flows in a channel from seventy-five to a hundred feet wide, for about a mile and a half. From this point to a small canyon near the railway it meanders through gravel bars similar to those described on the upper reaches of the creek. Emerging from the canyon, which is almost a quarter of a mile long, the creek crosses the flats of the Columbia and soon forms part of that river. In this section the valley widens. Bench lands that have been overrun by fire, and on which a new forest is appearing, are its principal features, until it merges into the valley of the Columbia.

Respecting the valley of the Columbia, I would refer to my report on the survey of sections 1, 2 and 3 in township 28, range 22, west of the fifth meridian, particularly to the part reading as follows:—

I have been told that this land is part of a timber reserve, and therefore not open for settlement. There is no timber here, and apparently never will be, as the new growth is confined to willow and poplar. If it is supposed that by keeping the place in a natural state an efficient fire break is provided between the railway and the country to the north, I would point out that the dead timber now strewn over the ground is very inflammable and a source of danger, while a cultivated field cannot be surpassed for checking the spread of fire. I would therefore take the liberty of suggesting that if this land is in a timber reserve, that the reserve should be withdrawn from that part that may be called the valley of the Columbia.

A wagon road from the town of Golden runs northwesterly alongside of the Canadian Pacific railway through Moberly, a flag station, to Blaeberry creek. This road is kept in repair by the provincial government. From this point a good trail runs along the east side of the creek for about eighteen miles. The gravel bars of the river afford good travelling for points farther north.

The soil throughout the valley is of a sandy and gravelly nature. The prevalence of summer frosts and late springs make its use, for general agricultural purposes, out of the question. Hay could doubtless be grown, but there are no wild hay lands. Feed for horses when travelling is not plentiful.

During the summer months the volume of water in Blaeberry creek is large. In the winter it is said to dwindle to insignificant proportions. The water during the time of high water is heavily charged with silt. The fall in the canyons is sufficient for the development of a large amount of power. The problem of bringing logs down the shifting channels that have been described seems difficult. My opinion is that a dam could be thrown across the creek at the entrance to the upper canyon, that would submerge the gravel bars and permit of the transportation of logs in safety. The extent of country that would be flooded and the damage that might be done would have to be considered when deciding on the height to which the water would be raised. A dam at the canyon near the railway would cover the bars on the lower reaches. As the banks are high in this section, it is probable that raising the level of the water would not affect the adjoining country. Wood is always available for fuel.

No indications of coal or lignite were seen. North of the east fork a mile or two, the mountains on the east side of the valley are strongly coloured with iron; with this exception no indications of minerals were seen.

Bears and goats are plentiful. This valley is of no apparent value except for its timber and pulpwood resources. The upper reaches are the most valuable in this

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respect. The poor and shallow soil is not conducive to timber of large size. The ground seems unable to provide sufficient nutriment for trees after they attain a certain size. Hence the cedar is usually hollow, and large healthy trees of any kind are rare. Still the valley produces fair timber, that with proper protection will remain a permanent asset to the country.

I have the honour to be, sir,

Your obedient servant,

J. A. KIRK, *D.L.S.*

APPENDIX No. 28.

REPORT OF G. J. LONERGAN, *D.L.S.*

RESURVEYS AND INSPECTION OF CONTRACTS IN CENTRAL ALBERTA.

BUCKINGHAM, QUE, February 4, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa, Ont.

SIR,—I beg to submit the following general report, concerning my survey operations during the past season.

In accordance with your instructions, dated April 1, 1906, authorizing me to continue the restoration surveys in Edmonton district, I started from home at Edmonton on April 23, where by previous arrangement, I had my transport ordered to meet me, and after engaging the men required for the summer's work and purchasing two months' supply of provisions, I started from Edmonton on May 3, for township 56, range 24, west of the fourth meridian. I travelled by way of St. Albert and Morinville, and thence east to the south boundary of the township. From Edmonton to Morinville, there is a good graded road, and as far as we could see on either side every acre is under cultivation. The soil is a good sandy loam, and for productiveness, I had only to look at the farmers' buildings and dwellings.

Morinville at the time of my arrival, was soon to boast of a railroad and station. The Canadian Northern railway had their grade built that far last December, and expected to have the steel laid by the end of June. Township 56, range 24, is suited for mixed farming. The southeast portion is thickly settled, and about three-quarters of it is under cultivation. The remainder was heavily timbered, but the recent fire has killed most of the trees and it is now nothing but a mass of windfall and brush.

The Alberta government is helping to build a road through the township, about 10 miles from the east outline. This will give the settlers from Legal a more direct route to Edmonton, and will help to open out that northern country.

My next move was to townships 59 and 58, range 22. To get there I crossed the Sturgeon river, one mile north of Namao, and thence east along the correction line to Fort Saskatchewan. I then went northeast along the Victoria trail about 20 miles until I came to a small Galician settlement. All this country is thickly settled, the occupation being mixed farming, and considerable attention is devoted to hog raising. In conversation with many of the settlers, I learned that the great drawback to hog raising is the lack of a continual market for hogs.

No doubt there is a great opening for a firm to establish a large pork-packing industry. There is at present a small plant, but they are not able to even handle the supply of pigs that the farmers have, nor are they even able to supply the Edmonton consumption with bacon and ham. The result is that the merchants have to

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meat, and the citizens have to pay from two to three cents more per pound. In short, the supply of raw material is there, the consumer is there, but the manufacturer is unfortunately absent.

On my arrival at these townships in which I had a few corrections to make, I found but four or five settlers. They had come that spring, and were busily engaged in making preparations to put up hay, their intention being ranching exclusively. Without a doubt they had chosen a good district, and will make a success of cattle raising, as long as they are not troubled by others who want to grow crops.

Vermilion river passes through township 58, and the valley has an average width of about a mile and a half, where an almost unlimited amount of hay can be cut. To the north there are many large sloughs, with about a quarter to half a mile border of good hay land.

Game is plentiful. I was there but two days, and saw a number of tracks of moose and elk. One of the settlers killed a large black bear, which had four cubs which he caught alive, two black, one brown, and a white one. Along the river bank, mink, marten, fisher, lynx are found, and in one place I saw where beavers were at work, building a dam.

My next move was to townships 54, ranges 20 and 19, to retrace the outlines of Elk park. The government is certainly to be congratulated in making this park reserve. The land is high up in Beaverhills, and is useless for farming, it being only rolling sand hills, and as the elk had already chosen it for their homes, it was but right that the government should perpetuate their choice by fencing them in and leaving them there to multiply.

By wire I was instructed to resurvey townships 51, ranges 2 and 3, west of the fifth meridian; so on July 3, I left Edmonton, going by way of Stony plain.

I would here like to correct the mistaken idea a number of people have that Stony plain is a rough rocky place, as the name would indicate. In fact I never saw a stone in the district; it is level, the soil is a rich sandy loam, and it is known to be the place where the best number one hard wheat is grown in Edmonton district. The place was formerly part of a reservation for a tribe of Indians, known as the Stony Indians, and hence its name.

The Canadian Northern railway have their grade built to within a mile of the post office, and they intend to lay the steel in time to move the fall crop.

All the land was taken up in township 51, range 2, and about one-third of township 51, range 3. The soil in most places is a sandy loam, and the surface is very rolling and covered with windfalls and *brulé*, and cut through by Saskatchewan river, which has in most places high perpendicular banks.

While working west of Edmonton, I came in contact with a number of the settlers, and in conversation with them as to the way they disposed of their grain, they said that a very satisfactory plan, was for a number of them to club together and load a car, and ship direct to commission merchants at Winnipeg, who would either store it in elevators or sell according to orders from the shipper, and that they had at times realised as much as six cents per bushel more than the Edmonton market, and never less than one cent higher.

Having completed the survey of these two townships, I received instructions to discharge half of my party, and to do sundry other scattered surveys. I returned to Edmonton on August 28, and made preparations for a move to township 52, range 12, west of the fourth meridian. The road that I followed was by Fort Saskatchewan and Star, thence southeast on Beaverhills lake trail to Vegreville.

The way in which the country is settling up, was a great surprise to me, for four years ago, there was not a dozen settlers, while to-day the trails are mostly all fenced and the settlers have put up good substantial dwellings and outbuildings, and I did not meet one settler, who was not perfectly satisfied with the country. Around every house they had vegetable gardens and were growing cabbages, onions, cauliflowers, carrots, parsnips, rhubarb, cucumbers, tomatoes, &c., and in many places sweet corn.

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One farmer had started a fruit garden and said there was no doubt about the possibility of growing strawberries, raspberries, gooseberries, currants and other small fruits.

On my arrival at the township, I found but four settlers, who had taken up land in the southwest corner, and as they had been there but a short time they had but few improvements made. The territory generally speaking is rolling, with sloughs and ponds in the hollows.

During the hunting season a sportsman would realize his most extravagant dreams of hunting ducks, geese, swans and pelicans which are there by millions.

I next started for township 56, range 3, west of the fourth meridian. I travelled by way of Dinwoodie to St. Paul's crossing of Saskatchewan river, and thence to St. Paul de Metis. There are not a great number of settlers along this road and those who are there are ranching, doing very little mixed farming. St. Paul is the home of the half-breeds. The mission is situated on the north side of lake Therien, and was started eight years ago by the Rev. Father Therien. After much privation and hard work, they have succeeded in changing a scrub country into a profitable farm and beautiful garden, built a large church, a school and a convent. Although the latter was burned down a few years ago, they are now rebuilding it. The garden is a model of neatness, growing all kinds of vegetables; their pumpkins, cucumbers, celery and tomatoes, would rank with the best I have ever seen in the east. They had a large crop of oats, barley and wheat; the latter would grade No. 1 northern. The mission has a steam thresher, sawmills, shingle mill, flour mill, crusher, together with a full complement of other farming machinery.

From St. Paul I travelled eastward along the old Battleford trail as far as Onion lake. Although the land is subdivided, there are but few settlers. The soil is generally good, but in a few places it is light and sandy.

Mr. Walker, the member for Victoria, told me that it was the intention of the provincial government to operate a ferry across Saskatchewan river some place between Moose and Dog creeks. This would give the settlers railway communication not more than thirty-five miles distant.

However, it will be a matter of only a few years when a railway will be built on the north side of the river; for at the present rate of immigration, such a large tract of good country cannot lie long in wait for railway facilities, and I heard it reported on good authority, that there would be a road in there before three years.

From Onion lake I drove south to Lloydminster. From the river to Big gully, there are no settlers. At Lloydminster I inquired from the land guide, why such a large tract of good land was not settled. He said it was impossible to locate a corner, as there was hardly a mound to be found and no posts, the result is that the land must remain idle until resurveyed. I completed the work near Lloydminster, and then returned to St. Paul, where I examined contract No. 23 comprising townships 59 and 60, ranges 7, 8, 9 and 10. The centre three-quarters of these eight townships can be classified with the best soil in the province of Alberta; at present it is uncultivated and unsettled.

I then returned to Edmonton, arriving on November 17, and as the ground was covered with about a foot of snow I bought three sleighs and started for township 51, range 22, west of the fourth meridian. This township was originally part of a timber reserve, but of late years the repeated fires have destroyed most of the timber.

I did not have time to travel over the reservation, so I made inquiries from the settlers. Mr. J. W. Morton, Tofield, Alta., informed me that the west half of township 52, range 19, has about sufficient timber for the requirements of settlers. Mr. H. K. Adams of the same place says that township 51, range 19, has no timber, save a few clumps of scattered poplar, and that there are some sections of good farm land which has not a tree greater than six inches in diameter. Mr. S. Adams, of Edmonton, says that township 52, range 20, has not more timber than will be required for building purposes for settlers. From what I have seen of the country, I think that the views of these gentlemen are about correct.

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Township 51, range 20, west of the fourth meridian which I subdivided, has no timber; the surface is rolling with numerous ponds and sloughs, and the soil is a sandy loam.

The Grand Trunk Pacific railway crosses the north half of the township, and it is expected that Cooking Lake station will be at the northeast end of the lake. Having completed the survey, I returned to Edmonton, where I discharged the men, stored the outfit and returned east, and arrived at Ottawa on December 23.

I have the honour to be, sir,

Your obedient servant,

G. J. LONERGAN, *D.L.S.*

APPENDIX No. 29.

REPORT OF J. W. McLAGGAN, Esq.

EXPLORATORY SURVEY IN SASKATCHEWAN AND KEEWATIN.

STRATHCONA, ALTA., November 1, 1906.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I left Strathcona on July 28, and reached Prince Albert on July 30, where I succeeded in securing a small Peterborough canoe at a cost of \$55. I could not get one large enough to carry provisions sufficient for the trip. I left Prince Albert on August 2 with August Krosse, my assistant, whose salary was \$60 per month. We reached Cumberland House on the forenoon of August 8. We had to get an Indian to guide us across the lake at a cost of \$5 for the trip. I could not get a large Peterborough canoe here, so bought a bark canoe from an Indian for \$13 which, with the one we had, was sufficient to carry our load.

I found that a guide could not be secured here and was told by the Hudson's Bay manager that one could likely be secured at Sturgeon river, north of Cumberland lake, I decided to cross the lake in the afternoon of August 9 in a small tug working for the Hudson's Bay company. We reached Sturgeon river late at night, and next morning I found that no guide could be secured there, so I decided to return to Cumberland and to go from there to The Pas, where a guide might be obtained. We reached The Pas on Wednesday, August 15, where no guide could be induced to leave until after receiving the treaty money, so we were compelled to wait until Wednesday, August 22, when we started off.

The weather had been very good this far on the trip and the gardens looked well at Cumberland and The Pas. Cucumbers, beans, corn and other garden produce were growing well.

I secured Pierre Highway, an Indian, as guide at \$2.50 per day and free tobacco. I had difficulty in getting a guide even at that figure.

(NOTE.—The report covering the period from August 22 to October 23 is taken from Mr. McLaggan's diary.)

Wednesday, August 22.—Started from The Pas in afternoon with outfit as follows: two canoes, tents, blankets, cooking outfit, rifle, shot gun, ammunition, fish net, pair climbing irons, field glass, magnifying glass and compass.

Used climbing irons and field glass in cruising country for timber, climbing high

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trees on hilltops and using field glass where a good view of surrounding country could be obtained.

Reached portage on evening of first day, having travelled 15 miles.

Thursday, August 23.—Made a portage of three miles and camped on Atikameg lake. The country is low and swampy, timber poor and land of poor quality; signs of moose; weather fine.

Friday, August 24.—Made fair run and camped at narrows on Atikameg lake. This is a beautiful lake with small mixed timber of poor quality along shores. Shores are rocky and composed of limestone. The country is level, and the land poor and rocky. Fish, such as trout, whitefish, jackfish and pike, are plentiful. Small fruits, such as gooseberries, raspberries, cranberries, black currants and red currants, are also plentiful. There is no sign of frost.

Saturday, August 25.—Went five miles on Atikameg lake and made two portages into Cormorant lake. Then went five miles on Cormorant lake and camped. The land is poor, timber small and of poor quality. Fish and game are plentiful. A great deal of this country is level and rocky, of limestone formation. Banks of lake about twenty feet above high water. This deposit of limestone may be of great value in time.

Sunday, August 26.—Weather fine, with high wind.

Monday, August 27.—Crossed Cormorant lake, and camped near upper end of Yawningstone lake. There was good spruce timber on north side of Cormorant lake, and along creek between Cormorant lake and Yawningstone lake, and also on south side of Yawningstone lake. This timber is of good milling quality, and would say there is from three to five million feet at this place.

Land north of Cormorant lake is good clay loam, where farming on small scale could be carried on successfully after timber was cleared away. A garden at George Cowan's, near Cormorant lake, looks very well. Potatoes, carrots, onions, turnips and cabbage doing well, with no signs of frost. Saw no signs of minerals on Yawningstone lake. Weather fine.

Tuesday, August 28.—Crossed Yawningstone lake in the morning, and had hard day on Cowan river, low water and driftwood in the stream giving us a great deal of hard work. Country low and flat, with some good spruce timber in spots, but only in small quantities. The greater part of the country seems to have been burned some years ago. Land is a clay loam mixed with sand, and is only fair for farming purposes. Signs of moose and bear very plentiful. Camped about one-half way up Cowan river. Weather fine.

Wednesday, August 29.—Find it slow travelling on this river. Camped about three miles below Black Duck lake. Country low and swampy, with some bunches of good spruce timber on west side of river, about four miles below Black Duck lake, about one million feet in all. Part of land along this river can be drained easily, and would be fairly good hay land. Moose and bear very plentiful. Weather fine.

Thursday, August 30.—Crossed Black Duck lake, and made long portage in afternoon. Country low and marshy, with scattered bunches of spruce and tamarack. Timber of small size, suitable only for railroad ties or pulpwood. Saw limestone on Black Duck lake, and small hay meadows on Upper Cowan river. Land poor and hard to clear.

Friday, August 31.—Slight frost this morning on Cowan river, but not enough to damage wheat. Weather fine in morning, but rain fell in the afternoon. Country low and swampy, and of little use for farming. Had long hard portage in afternoon in muskeg, with water and mud to the knees, distance about $1\frac{1}{2}$ miles.

The timber is mixed and scrubby and of very little value. Moose and bear very plentiful; also mink and other fur-bearing animals.

Saturday, September 1.—Reached Reed lake, made four portages and had a hard day's work, although we made only about five miles. Country low and swampy, and covered with mixed scrubby timber of no value.

Land, a clay loam, which could be farmed if it were drained. Weather fine, with high wind.

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Am leaving bark canoe here, as we do not expect to be bothered with low water after this, and our load is getting lighter.

Moose and bear still plentiful.

Sunday, September 2.—Weather fine and clear, but cool.

Monday, September 3.—Crossed Reed lake in the morning, with fine weather and fair wind. This is a beautiful lake, with many islands. Fish of the following varieties seemed very plentiful: whitefish, jackfish, pike and trout of large size. Water seems to be very deep. On south side of lake is spruce timber of medium size, about one million feet. Country back from lake burned, and growing up with poplar, which should make good pulpwood in a few years. Country very rocky.

Dark coloured granite streaked with white quartz on lower end of lake, and also on river to a distance of six miles below lake. Saw indications of iron on river about ten miles below lake, also good water-power where good business could be done in pulp manufacture at lower end of lake. Banks of this river are about fifty to seventy-five feet, steep and rocky. Saw two moose, also many bear tracks. Geese and ducks very plentiful.

Tuesday, September 4.—Weather fine and warm. Country very rocky. Granite with small streaks of white quartz; also indications of iron.

Splendid water-power above Wekusko lake, very easy to develop.

Mixed spruce and poplar of small size suitable for railway ties or pulpwood on north side of Wekusko lake. Country back from lake and river seems to be all burned. Banks of river higher and more rugged, reaching one hundred feet in some places. Small amount of good land near river. Clay loam, but only in small patches.

Wednesday, September 5.—Weather fine and warm. Made five portages past falls on river, all of which would make fair water-power.

Country much the same as yesterday; rough and very rocky in places, and light sandy loam in other places, with small jackpine and tamarack and small bunches of spruce near the river. The spruce is suitable for milling. Country back from river burned, and very difficult to travel through owing to the fallen timber. This must have been a good timber country before it was burned, and will soon be covered with young trees again if fires can be kept from running.

Saw good slate at falls about twenty miles below Wekusko lake on Grass river, and granite mixed with white quartz on lower end of the lake and on river below lake.

There are small patches of fair land in places, suitable for raising vegetables and garden produce. Fish are very plentiful in lakes and rivers.

Climate seems to be good. Saw butterflies. Hornets and other insects seem plentiful and are still very active. Leaves are green and no signs of any severe frost yet. Saw large black bear and heard timber wolves howling. Bears and moose seem plentiful here.

Thursday, September 6.—Fine and warm. Saw beaver on river to-day, also moose and many ducks and geese.

Country low, but some good land in places. Soil is clay loam mixed with sand, also there are some good hay meadows along Grass river, about ten miles above Setting lake.

Saw more quartz along river, also back from river in many places. I think this part of the country may prove rich in minerals when it is properly prospected, as the quartz seems to extend back from the river on both sides and the country has been burned over, leaving the surface of the rocks bare, making it easy for the prospector. Saw a few bunches of spruce timber near river, some of which have been burned by a fire early this season. Fish and game very plentiful.

Friday, September 7.—Reached lower end of Setting lake; weather fine and clear.

Setting lake is one of the most beautiful spots I have ever seen, fully equal to the Thousand Islands on the St. Lawrence, or to the famous Hudson river, and should in time become a great tourist resort.

There is considerable spruce timber around the shores and on the islands of this lake. This spruce would make milling timber of small size, averaging about twelve

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to fourteen inches in diameter. It is a young, sound, clean lot of timber, and there would probably be ten million feet in all.

Some good wild hay meadows on river above Setting lake and a small amount of good land in spots. Granite mixed with a small percentage of quartz covers the greater part of the country to-day.

Lynx, bear, moose and other animals are plentiful and there is fish in great abundance.

Saturday, September 8.—Reached Keewatin to-day. Weather fine and very hot, must have been 90° in shade at 4 p.m. Camped on river about twelve miles above Paint lake. Made six portages, two of which were around falls where good water-power could be developed. The river takes a drop of over thirty feet at each fall.

Small bunches of spruce and poplar grow along river, but back from the river the country is burned. Some fairly good land, but generally it is very rocky and rough.

Banks of river higher than yesterday, in some places one hundred feet above water.

Saw two moose and some mink. Ducks are here by hundreds and fish are very plentiful.

Sunday, September 9.—Weather fine, but there was a very heavy thunder storm last night.

Monday, September 10.—Reached Paint lake to-day. Weather fine and warm. Crossed to north side of lake in the afternoon. There are quite a number of islands here, with narrow channels between, with rocky shores and small mixed timber of very little value. A small amount of good land on north side of lake. Country back from lake burned the same as farther up river, but growing up again with poplar and other trees. Fish plentiful. Quartz still in sight, but not as plentiful as farther up river.

My Indian guide has not been down Grass river below Wekusko lake before, so is not familiar with channels, which makes travelling very tedious and slow.

Tuesday, September 11.—Fine in forenoon, but rained in afternoon. Spent to-day cruising on north side of lake, but found nothing of any value. Laid up for rain in afternoon. Saw a bear and some lynx and many moose tracks.

Wednesday, September 12.—Laid up with rain and wind to-day in forenoon. Crossed lake in afternoon. Saw fairly good bunch of spruce on south side of lake. This timber is of small size suitable for railway ties or pulpwood. Camped at outlet of river and will start on return trip up river to-morrow.

Weather cold this evening.

Thursday, September 13.—Made good run up river. Camped at lower end of Setting lake. Weather fine, but cold, with quite a heavy frost this morning. Leaves are falling and it begins to look like autumn. Made six portages, none of which was over a quarter of a mile.

Friday, September 14.—Made forty miles up river with fair wind. Camped at mouth of Mitishto river. Weather cool and cloudy, with slight rain.

Saturday, September 15.—Rained all day, so did not move out. Caught some very good whitefish and salmon trout. River seems to be teeming with them, also with jackfish and goldeyes.

Sunday, September 16.—Weather clear and cool.

Monday, September 17.—Weather clear and still cool, but no frost. Shot a timber wolf, and saw some lynx and beaver work on the river. Moose and bear very plentiful.

Tuesday, September 18.—Reached lower end of Wekusko lake. Weather cool and cloudy. Saw a bear. Moose and fish plentiful. Saw two beaver houses on bank of river.

Wednesday, September 19.—Weather clear and cold. Crossed Wekusko lake in forenoon and camped below Réed lake. Saw more indications of iron on river to-day and am of opinion that there will be iron found in this part of the country.

Thursday, September 20.—Made nine portages in forenoon below Reed lake.

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Crossed lake in the afternoon, reaching the portage between Reed lake and Methy lake in the evening. This portage is six miles long so expect hard work to-morrow.

Friday, September 21.—Rained during the night, and at times to-day. Got our outfit and canoe over portage and camped on Methy lake. Land light and sandy and of little value for farming purposes. Timber largely jackpine and tamarack of small size. A small part of it suitable for railway ties.

Shores of Methy lake low and rocky, with white quartz showing in places on south side of lake. Saw a black bear and many signs of moose.

Saturday, September 22.—Crossed File lake in forenoon and camped on File river below Loonhead lake. There is more muskeg here than on Grass river. Small scrubby mixed timber is seen which, with the exception of a bunch of spruce at lower end of Loonhead lake is of very little value. Of this there may be five hundred thousand feet. The trees are of small milling size, averaging twelve to fourteen inches in diameter. Country back from river has been burned at the same time as country near Grass river. Fish seem to be abundant in File and Loonhead lakes. Weather fine but cool. Leaves falling fast.

Sunday, September 23.—Weather fine and cool. Fish plentiful in river near camp. Low land seems to be muskeg and high land seems to be rocky at this point.

Monday, September 24.—Wet and foggy to-day. Camped on File river above Burntwood lake. Country on this river low and muskeg in some places and rough and rocky in others, with a small percentage of fairly good land in small patches. Saw no timber of any value and do not consider this part of the country as good as country around Grass river. Fish are very plentiful, but moose, bear and other animals seem to be scarce, and all the country that I have been able to walk through has been burned, with exception of spots near lakes and rivers where fire was stopped by water.

Tuesday, September 25.—Ran down File river this forenoon, but Indian guide has not been on File river previous to this. This river has many channels, and is rather baffling in some places, and as much time is likely to be lost in finding our way, I think it best to return up river from here and explore country along the upper Grass and Goose rivers to Cumberland lake. Camped on river below Loonhead lake. Weather fine in forenoon but bad thunder storm in afternoon.

Wednesday, September 26.—Reached Methy lake to-day. On way up saw no timber of any value except that already described at Loonhead lake and very little good land. Weather fine, with high wind on File lake. Very rough crossing the lake but no accident.

Thursday, September 27.—Weather fine, with wind still high. Reached the long portage in forenoon, crossed and camped on Reed lake. Moose tracks very plentiful.

Friday, September 28.—Fine weather, wind still high. Crossed west end of Reed lake in forenoon and ran up Grass river about half way to Elbow lake. Good spruce and poplar timber above Reed lake near river. Trees of good size. About two million feet can be got here, balance of country burned.

Some small spots of good land but country generally rough and rocky, with some muskeg.

Saw a little white quartz to-day, but not as plentiful as at Wekusko lake. Made three portages over small rapids. Fish very plentiful.

Saturday, September 29.—Weather fine. Heavy frost in morning and cold all day. Saw some good spruce on river to-day, but only about two hundred thousand feet. Country back from water is burned and green timber only along lakes and rivers. Country to-day rougher with high hills on both sides of river below Elbow lake, very rocky with soil nearly all burned off, leaving rocks bare in many places.

White quartz cropping out again along the river below Elbow lake and also on lake in considerable quantities. What I saw does not impress me as being rich, but there is a wide field here for prospecting. Crossed Elbow lake about noon and camped on river below Cranberry lake.

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Moose, bear and other animals not as plentiful as on the lower Grass river. Country between Elbow lake and Cranberry lake largely muskeg.

Fish very plentiful all the way up this river.

Sunday, September 30.—Cold and windy. Leaves all off trees, and it begins to look like winter. Caught some very nice lake trout near camp.

Monday, October 1.—Rain and fog. Camped on Cranberry lake. Saw some fairly good spruce timber along lower end of this lake in bunches of one hundred thousand feet. Think there would be one million feet in all. Country rough and very rocky. A few small pieces of good land and some muskeg.

Saw one moose. Many moose and bear tracks near lake.

Tuesday, October 2.—Rained all day. Did not move camp. The worst storm of trip.

Wednesday, October 3.—Still raining with high wind. Still in camp here.

Thursday, October 4.—Snowing to-day, quite hard, but not cold. Camped about half way up lake. Saw very little timber or good land, and country burned as before.

Friday, October 5.—Snow fell in forenoon and rain in afternoon. Ground covered with snow in morning, but gone by evening. Reached portage between Cranberry lake and Athapapuskow lake in the evening. Country rough and rocky with poor growth of scrubby timber of little value. Some muskegs near upper end of lake and some small hay meadows.

Moose and bear tracks plentiful. Fish in abundance.

Saturday, October 6.—Rain in forenoon; bright afternoon. Crossed portage one and one-half miles into Athapapuskow lake in the morning and reached Goose river, about five miles on Athapapuskow lake, by noon. Saw some small bunches of spruce near portage on Athapapuskow lake, also on Goose river, but only in very small quantities, as this country has been burned as before described. Made six short portages in afternoon and camped on Goose river above Goose lake.

Whitefish are so plentiful in this river that they can be killed in any number with sticks. The water is very shallow in places, being only six inches to one foot in depth, and the fish seem to cover the bottom. I think this must be their spawning ground.

Some fairly good land on lower part of river to-day in small parcels, but country generally rough and rocky.

Moose and bear signs not as plentiful as on Cranberry lake. Quite cold this evening.

Sunday, October 7.—Cold in night and early morning, but began to rain about 10 a.m. There was ice on water along river banks in morning and ice on water pails about three-quarters of an inch in thickness. This was the first really cold night of season.

Fish are continually playing up and down river in front of camp to-day.

Monday, October 8.—Snow and very high wind. Camped near lower end of Goose lake. Country about upper end of Goose lake low and boggy and of very little use. Saw some small bunches of spruce and poplar near north side of lake, but only in small quantities. Limestone on south side and west end of this lake. Bulk of country burned. Fish plentiful.

Tuesday, October 9.—Very cold. Ice on water along shore of lake and snow on ground. Warmer in afternoon. Crossed end of Goose lake in the morning and ran down Goose and Sturgeon rivers to Cumberland lake, reaching lake in the evening. Quite a large tract of fairly good land along Goose river below Goose lake, and also on Sturgeon river between the mouth of Goose river and Cumberland lake. Soil is a clay loam mixed with a little sand. This land has brush and small trees, mostly poplar, but would not be hard to clear. Have seen no open prairie north of the Saskatchewan.

There seems to be limestone on Cumberland lake in considerable quantities, but banks of lake are not high, being in most places not even twenty-five feet above high

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water and in some places are quite low. The limestone in this part of the country may be of great value in time.

Wednesday, October 10.—Cold in morning, wind blowing a hurricane from west until noon, when it calmed a little so we could venture out on lake. We ran down to lower narrows, reaching there in the evening. Weather fine.

Thursday, October 11.—Fine and warm. Reached Cumberland House at noon and ran down the Saskatchewan in afternoon on way to The Pas. Camped about twelve miles below Cumberland.

Friday, October 12.—Fine and warm. Made good run. Camped ten miles below the 'barriers' on river. Saw three moose crossing river. Bear and fox seem plentiful.

Saturday, October 13.—Clear and cold. Reached The Pas in evening. Water very low, which makes travelling very slow.

Sunday, October 14.—Cool and cloudy with slight rain in the evening.

Monday, October 15.—Cold and windy. Raining in afternoon. Disposed of nearly all my outfit in forenoon and started at 3.30 p.m. to walk out to Etoimami, ninety miles along the right of way of Canadian Northern railway carrying provisions for three days, but have neither blankets nor tents. Camped in open about six miles from The Pas. Weather cleared up in the evening and we spent fairly good night. Country here low and largely muskeg. Walking very bad.

Tuesday, October 16.—Cloudy but dry. Made twenty miles. Road very wet and country nearly all muskeg. Camped in the open again. Weather cold, but dry. Had a good night.

Wednesday, October 17.—Cloudy again, but cool and dry. Made about twenty-five miles. Country still muskeg and wet in places. Camped in open again.

Thursday, October 18.—Country low and wet in forenoon, but getting better in afternoon. Saw some good spruce near track, also poplar. Camped in open about eighteen miles from Etoimami.

Friday, October 19.—Weather fine. Reached Etoimami at 2 p.m.

Saturday, October 20.—Left Etoimami at 4 a.m. and reached Prince Albert at 2 p.m. No train till Monday.

Sunday, October 21.—In Prince Albert.

Monday, October 22.—Left Prince Albert on morning train and on reaching Warman found westbound train eighteen hours late.

Tuesday, October 23.—Reached Strathcona in evening.

In conclusion I would say that for the amount of territory travelled over, I think this is the best sportsman's country in the world to-day. Good time can be made travelling with a canoe on all the waters I was on. Game and fish are abundant everywhere. During the trip I saw ten moose, six bear, one deer, one timber wolf, over a dozen lynx, quite a number of mink and other fur-bearing animals, and ducks and geese innumerable. This should become a great tourist resort when better known.

As a farming country: the summer seems to be good, and where good land is found there should be no trouble in raising good crops of all the hardy grains and vegetables, but the greatest drawback to farming would be the difficulty of making wagon roads from place to place, as the country between the spots of good land is rough and rocky.

As a lumber country: the fires seem to have burned over nearly all the country, and I was not able to walk far enough into the interior to find any land not burned. From the information I gathered from Indians and trappers, I would conclude that this burned land reached from Grass river to Burntwood river with the exception of small areas along the lakes and rivers. There is a growth of young timber coming up since the fire which may be of value in time.

As a fishing country, it is good. The fishing industry should be good as soon as a railway is built, as there are immense waters teeming with fish.

As a mineral country I would say that there is a wide field for prospectors. In the country I travelled over I saw indications of gold, silver, iron and limestone. Indians and white men from the north tell wonderful stories about a place called Indian lake, north of Nelson House, also about an island on Burntwood river, where

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minerals of different kinds and oil are said to exist. About the route of the railway to Hudson bay I would say that preliminary survey is already run from The Pas to the southeast of Reed lake and my observations would lead me to think that this is the best route that could be followed to that point. From there on, I think the road should cross Grass river between Reed lake and Wekusko lake, and down the north side of Grass river and Setting lake, passing north of Paint lake. This route would take the railway through the best part of the country where there would be the most local traffic.

I might say that in travelling in that part of this country I have found the Indians very trustworthy and reliable, and have found the Hudson's Bay Company's officials, also Revillon's traders, to be very obliging and willing to give information and help in every way. Had it not been so, I could not have travelled as far as I did in the limited time at my disposal, having travelled at least eleven hundred miles by canoe, made eighty-three portages, and spent a considerable part of my time travelling on foot. We had no accidents, no sickness and very little lost time, except in Cumberland and The Pas waiting for a guide.

I sold the outfit at The Pas, getting thirty-four dollars for the rifle, eleven dollars and fifty cents for the shot gun and five dollars for the compass, but the other things, including the canoe, which was somewhat damaged, I sold cheaper and the bark canoe was left at Reed lake.

I have the honour to be, sir,
Your obedient servant,

J. W. McLAGGAN.

APPENDIX No. 30.

REPORT OF GEO. McMILLAN, D.L.S.

INSPECTION OF SURVEY CONTRACTS IN CENTRAL ALBERTA.

OTTAWA, March 1, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on the examination of surveys in the Edmonton district during the season of 1906 under instructions from you dated May 11, 1906.

After having collected what information I could with reference to the contracts, I left Ottawa on May 15, and arrived in Edmonton on the 19th. I at once called upon Mr. P. R. A. Belanger, D.L.S., as instructed, and proceeded to outfit. On May 29, I left Edmonton for contract No. 15, of 1905, and on the way made a traverse of part of Batty lake. This journey involved a trip of one hundred and thirty miles, of which the last twenty miles of trail were abominable. The townships in this contract (townships 59, 60, 61, 62, 63, and 64, range 12, and townships 58, 61, 62, 63 and 64, range 11, west of the fourth meridian) are almost entirely wooded with poplar. Townships 63, ranges 11 and 12, are traversed by Beaver and Little Beaver rivers, which come together in section 20, township 63, range 12. On Beaver river there are several rapids and considerable water-power might be developed. There are no settlers as far as I have seen, although the soil is of a good quality and will be suitable for farming as soon as the timber is cleared off. On the return trip I made a traverse of part of the Upper Mann lake and arrived back in Edmonton on July 12.

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On July 14, I proceeded to contract No. 12 (townships 59, ranges 1, 2 and 3, township 60, range 1, west of the fifth meridian, and townships 59 and 60, range 27, west of the fourth meridian) and reached there on the 19th. I spent six days in the examination thereof, the weather being most unfavourable. In these townships many families were settled, a majority or all of whom had squatted and during my stay there land seekers were swarming into the vicinity. The soil is suitable for farming purposes, and the water supply is abundant, the townships being traversed by Paddle and Pembina rivers. There are some patches of large timber, but a large percentage of these townships is covered with small poplar and willow scrub.

I next proceeded to contracts Nos. 19, 17 and 20 and examined them in succession. Contract No. 19 is composed of townships 54, 55 and 56, range 6; contract No. 17, of townships 54, 55 and 56, range 7, townships 53 and 54, range 8, and township 53, range 9; and contract No. 20, of townships 55, 56 and 57, range 8, all west of the fifth meridian. The old pack trail leading from Lake St. Ann northwestward has recently been cut into a wagon road and a ferry established across the narrows of lake St. Ann. These townships are largely wooded and very densely so in the vicinity of Pembina river. Seams of coal crop out in several places along the Pembina, and as far as I have seen remain undeveloped. In contract No. 19 there are many large hay meadows, but not much prairie. Contract No. 20 has been burnt over in large sections and a luxurious growth of grass appears among the dead timber and scrub. Contracts 19 and 20 are, I think, specially suited to farming and stock-raising. This completed my examination of the 1905 contracts, and I returned to Lake St. Ann, arriving there on August 28.

According to instructions I next proceeded to townships 60, ranges 3 and 4, west of the fifth meridian, being part of contract No. 15, of 1906. A large percentage of these townships has been burnt over and has grown up with small poplars and willow scrub; the soil is of a good quality. There are small berths of spruce timber of considerable importance in both these townships. There are some settlers in township 60, range 3.

I next visited the adjacent contract, No. 20, composed of townships 56, 57, 58 and 59, range 4, west of the fifth meridian. Townships 58 and 59 are especially suited to stock raising and in the vicinity of Paddle river large herds of cattle are reared. Township 57 is traversed by Pembina river, and is largely covered with timber and heavy windfalls, the south and eastern part being largely swamps and muskeg including a valuable berth of spruce timber. Township 56 is very rolling and better suited to stock raising than farming. Townships 56 and 57 are traversed by a wagon trail leading from Lac la Nonne northwesterly and known as the Grand Trunk trail.

I examined township 57, range 5, west of the fifth meridian, of contract 16. This township, as far as I have seen, is suitable for farming and stock raising, the timber being light except in the close vicinity of Pembina river. There is good grazing even in the woods, and several quarters have been squatted upon.

I next visited contracts Nos. 1 and 21. Contract No. 1 is composed of townships 49 and 50, range 6, and contract No. 21, of townships 54 and 55, range 7, townships 50 and 51, range 6 and township 50, range 5, all west of the fifth meridian. They are traversed by Saskatchewan river and the part north of the river being fairly good soil is somewhat settled. South of the river the soil is light and includes a timber limit. Lumbering is pursued there. There are large deposits of beautiful sandstone on the Saskatchewan and some quarries have been surveyed. I completed this work on November 12 and left for Edmonton, arriving there on November 16. On November 14 and 15 there was a heavy snowfall, which necessitated a change in my transport. I stored the wheeled rigs and bought two sleighs. I also received one heavy horse and a set of double harness from Mr. G. J. Lonergan, D.L.S. I arranged for the keeping of five horses till I should return, and left for township 58, range 21 and township 59, range 20, west of the fourth meridian.

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Both of these townships are as yet but sparsely settled. They are well wooded and the soil is good. In township 59, range 20 there are some fine hay meadows. I next proceeded to townships 61, ranges 25, 26 and 27. The soil in ranges 25 and 26 is of a light nature but both contain some valuable spruce timber. In section 19, township 61, range 25 there is a sawmill which is of great service to settlers in the adjoining townships. The soil in township 61, range 27, is good, and large quantities of hay can be procured in the vicinity of Pembina river. My last work was the examination of townships 58 and 59, range 27, being part of contract No. 14. These townships have become well settled. They comprise a good farming district. In section 5, township 59, range 26 there is a large sawmill in operation.

This concluded my work for the season, the winter being somewhat severe and the snow quite deep, horses would be unable to continue without shelter. I wired for instructions and disposed of the outfit accordingly. I reached Ottawa on January 24, 1907.

I have the honour to be, sir,
Your obedient servant,

GEO. McMILLAN, *D.L.S.*

APPENDIX No. 31.

REPORT OF C. F. MILES, *D.L.S.*

SURVEYS AND RESURVEYS IN SOUTHERN ALBERTA.

TORONTO, January 31, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit my general report on last season's (1906) operations in southwestern Alberta under your instructions, dated April 18, June 7, 18 and 22, and August 25, 1906.

I left Toronto April 28, arriving at Calgary May 2; I had previously sent my cook and another man to Macleod to collect my outfit stored at Stavely and Nanton. It was the 5th before I could obtain my outfit from the railway company, and having to repair my wagons, it was the 9th when I pulled out for township 21, range 27, west of the fifth meridian. Two of my men with a wagon load of supplies went by trail to High River to await my arrival there.

Commencing work on the morning of May 10, I measured the north boundary of section 19 to the northeast corner of this section, where no trace of a monument was found; it had fallen into a ravine and been washed away. I then continued this line east along the north boundary of section 20, to the northeast corner of this section. I retraced the lines of the east boundary of section 19 and east boundary of the southeast quarter of section 30, thus obtaining the intersection of the two lines for establishing the northeast corner of section 19. After traversing the south side of Bow river in section 29 and also the island, or what would be an island in high water, I had the necessary data for calculating the required areas.

After completing this work I left here on the 14th for High River, but finding that one of my mares had been kicked so severely, that she could not move a step, I ex-

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changed her for another horse with Mr. Robert Begg of Dunbow, paying him fifteen dollars on the deal. I have since heard that the mare (Jessie) is still lame.

We left High River on the following day for township 18, range 3, west of the 5th meridian, but owing to continuous rain and snow storms we did not reach there until the 18th. From the following day on there was snow and rain daily up to May 30, preventing me from putting in more than four full days of field work. I completed the survey of this township north of Highwood river by tieing in with the survey of the south side of the river.

Owing to continuous rains the river could not be forded. I therefore moved north into township 19, range 3, west of the fifth meridian (all my work from May 15 lies west of the 5th meridian). I found four settlers in the part of the township that I surveyed. On the west side, the township is very hilly; on the east side, too, there is a range of hills. A surveyed trail traverses sections 1, 12, 14 and 23, but we found it impassable, for in the two latter sections it passes through continuous swamps. The proper place for this trail to be located is along the ridge through sections 13 and 24, which sections the present travelled trail traverses. The part of this township, within the limits of my survey, is principally adapted for grazing. The remaining part of the township appears to be more wooded and also more hilly. Cattle appear to thrive, owing to the luxuriant growth of grass and plentiful supply of water. It is doubtful, however, if any crops could be raised here for though the soil is all that could be desired, the climatic conditions are not favourable for the ripening of grain. Potatoes and the more hardy vegetables have been grown successfully in the eastern sections, but a crop cannot be depended on at all seasons. This statement holds good in respect to nearly all townships that have come under my observation within the third range. From township 19, I moved into township 20 in the same range, where I completed the subdivision in the northerly part. It is mostly hilly and rolling with valleys running between the ridges; the soil is good and there was some grain growing here in the easterly part of the township but not on a large scale, most of it being cut for green feed.

I have seen some fine vegetables that were grown in the northeasterly quarter of this township. There is a good deal of brush and some poplar and spruce on the northern exposure of the hills. After finishing the work here we moved to township 18, south of Highwood river, where I re-ran the east boundaries of sections 20, 27 and 26, and the north boundary of section 21, tieing in with the survey lines from the north of the river. This portion is also hilly and brushy and although the soil is good it is adapted only to stock raising. I then moved camp to section 2, where I surveyed the east boundaries of sections 2 and 11 and sections 6 and 7 over high rolling and hilly prairie. This is a fine grazing country and well watered by springs. While here, I received your instructions, dated June 18, and proceeded with four of my party to the north boundary of township 19, range 3. There I retraced the north boundaries of sections 33, 34, 35 and 36, made monuments at the northeast corners of sections 34 and 35 and re-established the east boundary of the northeast quarter of section 34, also the east boundary of section 3 in township 20.

I rejoined my party July 5, who in the meantime had moved to section 3 in township 17, where they had been compelled to stop running the lines owing to an accident to the instrument. Here we surveyed the east boundaries of sections 3 and 10, 4 and 9, 5 and 8, also the north boundaries of sections 9, 10 and 11. These consist of rolling prairie, with some brush more particularly on sections 5 and 8. In the vicinity of Pekisko creek along the south boundary of this township there is quite a fringe of large poplar and balm of Gilead. This district appears to be given up entirely to ranching, for which, to judge by the vegetation it is admirably adapted. As most of these lands are stated to be under lease and no new settlers may be expected to enter, the pasturage privileges can more conveniently be regulated and in accordance with the requirements of those specially interested. The soil consists of a good depth of black loam underlaid with clay in the bottom lands and with gravel and shale on the highlands.

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On July 9 we pulled out for the southeast corner of township 15, range 2. After cutting out the jog, 9 chains and 20 links, we planted a flag to line in with the east, and then moved on to the southwest quarter of section 1, township 15, range 1, through a very hilly country and over a rough trail, causing the upset of a wagon in a creek. Having to use this trail again on various occasions, I had it repaired, entailing two men's work for a day. The following day I located the southeast corner of township 15, range 1, on the fifth meridian and cut out this line south for about a mile in order to turn off the angle for the south boundary. I completed the subdivision of this township by running the east boundaries of sections 3 and 10, 4 and 9, 5 and 8, and 6 and 7, over very hilly country, covered in part with a dense growth of willow and second growth poplar. There is some spruce in this district but most of it has been cut for a portable sawmill, that has been operating just south of the south boundary of section 1. There are six settlers within the limits of my survey, five of whom made out statutory declarations, the sixth, on an odd-numbered section, the southwest quarter section 1, being absent. They are all new arrivals, occupied in ranching on a small scale. They are also growing vegetables, but most of their potatoes had the tops frozen on the morning of August 4.

I omitted to mention in the proper place that on June 18, in compliance with your instructions, I tied in the old surveyed trail in township 20, range 3, with the interior surveyed lines.

On July 18, I found it necessary to dismiss four of my men, who proved most inefficient and whose services I was glad to dispense with. I paid them off according to their signed agreements and sent them in to Nanton, the nearest railway station. Their places were filled a few days later by a better class of men, for three of whom I had to send to Calgary, men being very scarce on account of general haying operations then in progress.

On July 23 I moved to the northwest quarter of section 6, in township 15, range 1, from where I finished the subdivision and also subdivided part of township 15 in range 2. In locating the southeast corner of township 15, range 2, and the northeast corner of township 14, range 2, there was a surplus of 3 chains and 2 links. Later I found that the east boundary of the latter township was deficient in measurement. The soil in township 15, range 2 is black loam with clay subsoil, covered to a considerable extent with willows, scrub and poplars, mostly second growth. There are no settlers, but the locality is overrun with cattle owned by ranchers in adjacent townships. The country is very hilly and therefore not specially adapted for farming, even if the climatic conditions were favourable, which is extremely doubtful. Much of this township I learn is under lease, or has been purchased by ranchers, who make no effort to cultivate the soil.

On August 6, I moved camp to section 28 in township 14, range 2, surveyed the north boundary and then ran a trial line from summit to summit, without much cutting, along the east boundaries of sections 4 to 33, closing on the north boundary of the township, when I discovered that an error existed somewhere, which I finally located in the south boundary of the township as already explained in my letter to you of September 27 last. There are only three settlers in this township, all of whom are engaged in stock-raising, for which this township is particularly suitable. No cultivation of any kind has been attempted here, and although the soil in the valleys is very good, I am led to believe that the crops will not ripen. It is traversed by high and more or less wooded ridges. Between the ridges there is good grazing and large quantities of hay is cut annually in the valleys. There is a good supply of water in the creeks. Willow creek from 50 to 100 links wide and about one foot deep, meanders all through sections 29, 28, 27, 26 and 25, and another one, Rice creek, a tributary to Willow creek, runs through sections 10, 15, 22, 23 and 26. This creek is so named, not because wild rice is found along its banks, but after a settler of that name, since departed. Other numerous springs have their sources in the ridges already referred to and another creek takes its rise on section 12, running easterly into Willow creek.

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Most of the available timber on the ridges has already been cut by the neighbouring settlers and ranchers. Therefore, but a small quantity is available, indeed barely sufficient for others that may settle here.

On August 28 I received your telegram instructing me to proceed to the fourth base line across the Livingstone range and valley; believing it to be urgent, I broke camp on the 30th, and moved to section 7, township 13, range 2, as far as I could travel with wagons. While some of my party were looking for the line, the north boundary of township 12, range 2, I drove with a couple of men to the east boundary of section 36, township 13, range 2, to check an observation, in which I succeeded. On my return to camp no monuments had yet been discovered. On the fourth base finally a wooden post in mound was found at the north east corner of section 35, township 12, range 2, and we afterwards found a picket lying on the ground at a pile of stones on a high ridge about a mile west. From here we traced the base line (instrumentally) to the wooden post and mound at the northeast corner of section 13, township 12, range 3. It was found in a dense poplar bush, apparently grown up since the first surveys, but all traces of a line were completely obliterated. There we had to pack the outfit with horses, running west about two miles, having previously attempted an observation of Polaris, which proved only partially successful. At the above corner I laid off the prescribed deflection angle, having a back sight of about two miles. Then not being able to get nearer to the work, I moved around to the Indian pack trail by way of section 25, township 13, range 2. In order to facilitate the move, I secured the services of a young man who had previously acted as guide for other parties. We followed the pack trail about half way across the Livingstone range, then left it to strike south over a stony and rocky divide and succeeded in making camp in the valley of a creek running west to Livingstone river and about one mile from the base line. This line crosses one high ridge after another alternating with deep ravines, containing springs and creeks, and all solid timber consisting of spruce, banksian pine and some poplar. The former two attain a diameter of as much as thirty inches and should become of considerable commercial value if the valley of Livingstone river is ever tapped by a railway, which I heard reported was likely to be the case in the early future. There is also said to be coal in the neighbourhood. Different varieties of trout are found in the river, some of those seen by me measuring nearly two feet in length. The open stretches along the valley do not appear of any great extent, the bottom lands being generally more or less bushy and sometimes swampy. The valley proper is not wide, varying from 10 to 40 chains in width. An old north and south survey line was found a few chains west of the river with, at the northern extremity, a four-inch squared post (lying on the ground) marked 'T. B. 600.' Nothing else showed what it delimited, but it presumably marked the northeast corner of a mining location. Owing to unpropitious weather, I secured no satisfactory observation of Polaris, and though I succeeded in obtaining a single view of the star several times, the sky immediately afterwards became obscured, it now being the time for arrival of the early September snowstorm. I did not delay longer than absolutely necessary, fearing I should be snowed in with but a scanty supply of provisions.

Several deer were observed from the pack trail as we were going and returning, and there were also signs of mountain sheep and goat as well as grouse and partridge. Some partly opened stretches were observed along creek bottoms running west into Livingstone river. The river varies from one to two chains in width with an average depth of not much over a foot and is very rapid. I extended my line into the thick woods one mile into range 4, at the terminus of which I considered that I had fully traversed the valley of Livingstone river. A few miles down the valley, my guide informed me that a settler was located and engaged in ranching.

Having completed this survey I recrossed the Livingstone range and returned to township 14, range 2. I finished the subdivision of this township, and also resurveyed a portion of township 13 in the same range. A number of settlers had crowded into the last named township and had made many improve-

ments on lands now said to be leasehold. They state they settled here in good faith, acting on the advice of some land agent, either with or without authority, and believing that this land was opened for settlement. The settler naturally concluding that he had the right on his side, continues in possession, where in the end, after a few months or perhaps a year, he unwillingly realizes that he has no claim or anyway that the ranchers claim is a preferred one. Then, after the loss of his time, his money and hay and his improvements, which latter may consist of house, barn, fencing, &c., he is compelled to abandon all and start afresh in search of another homestead. The rancher may be within his legal rights but if such be the case, the settler should not have been advised to settle or permitted to remain. Very few of the ranchers held leases but enjoyed all the benefits of occupation of large tracts of pasture land with a free run of the same and without expense, but as soon as the settler ventures to locate, the rancher applies for a lease and then, the unfortunate settler, poor as he frequently is, has had his labours and his outlay in vain.

On October 14 we again broke up camp and started for High River. In passing I rechecked the east boundaries of sections 2 and 11, 10 and 3, in township 15, range 1. At High River wagons were repaired, horses shod and a new stock of supplies laid in, after which, passing through Okotoks and Millarville by good trails, we reached township 21, range 4. Here we searched for monuments on the north boundary of this township and found a W. P. in mound at the northeast corner of section 32. Thence cutting out the line east and west wherever bush, we found the other monuments. I commenced the subdivision of township 21, range 4, on October 6. The lines previously run in this township were obliterated and had therefore to be opened out anew as they were mostly covered with willow and second growth poplar. There is some good timber here still standing although some of it was cut years ago when a sawmill was brought in and operated on the northwest quarter of section 10. A good sized creek runs southeasterly through sections 30, 29, 20, 21, 16, 10, 11 and 12. There are flats along the creek bottom but these are mostly covered with willow and willow scrub. Good spruce and banksian pine are found in different parts, the heaviest growing along the north boundary near Whiskey creek. This creek is said to have derived its name from several illicit stills which at one time were in active operation along its banks. Bunches of spruce and banksian pine (generally called jackpine here) are found on sections 7 and 8, 16 and 17, 19, 20 and 21, 28 and 29, 32, 33 and 34, 22 and 24. These sections it might be advisable to set apart as timber berths.

The principal timber and larger areas are found in sections 28, 29, 32 and 33. This timber is somewhat difficult of access, but it could be got out by a winter road running southerly along the Morley Indian pack trail; also by-way of the valley of Whiskey creek along which a good winter road might be constructed down to the south fork of Fish creek. This township is not adapted for general farming. It is very hilly and its only value at present lies in its timber and its being suitable to a limited extent for grazing purposes. Many horses and cattle roam here. The grass lands have the appearance of being overstocked, the pasture being very bare in places. There is one settler in an adjoining township who is said to be possessed of a herd of 3,000 head of cattle, who seeing the necessity of retrenchment disposed last fall of 600 head. Another settler also in an adjoining township has 600 head of horses besides some cattle and they all have the run of this township where there are no fences as yet to stop them from roaming.

In order to complete the subdivision of the northerly part of this township I moved around to the southwest quarter of section 36, quite a long detour, it taking me a day to make the move with my outfit. It had been my intention to move up the Morley pack trail which is quite swampy in places, but going down along Fish creek over frozen muskegs, the trail proved so exceedingly rough that I broke an axle of one of my wagons. The roads in the township are mere winter trails and passable only with sleighs and when there is good snow on the ground. A well graded wagon road leads both from Millarville and Priddis to the sawmill that is at present operat-

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ing on section 25. Much of the timber on this section has already been cut, but there is some good timber still standing in section 24. After surveying the north boundary of this township I borrowed a sleigh and moved my outfit on November 22 along an old tote road to the south fork of Fish creek near a settler on the southwest quarter of section 22, in range 4.

While here I was approached by an engineer asking employment as assistant. He claimed to have been in foreign service for many years and more recently had been running an instrument on the Canadian Pacific railway's irrigation ditch east of Bow river. On the strength of this application I wrote you my letter of November 12, receiving your reply dated the 22nd favourable to my suggestion. I then sent one of my men (an Indian) on the 25th to Morley from where he returned on the following evening with two more Indians. The same day my prospective assistant arrived at my camp and I found he could not qualify nor could I accede to his stipulations. I had now more men than the allowance called for, but I concluded to keep them on for a short time to further the work in this township, and I may here state that better men in a brush township than I had secured in the Stony Indians could not be desired. They are excellent ax or brush-hook men, very willing and good at keeping line. I never tried them at mounding. They may possibly not be quite so efficient with the spade or pick.

This township is very hilly and brushy. The greater part is covered with willows, poplars and spruce and more or less scrubby in the valleys. There is good grazing whenever there are openings and it is well watered. The south fork of Fish creek meanders through sections 18, 17, 21, 22, 15, 14, 11 and 12. There is a number of small springs tributary to it. It averages about twenty-five links in width and about twelve inches in depth. There are some good meadows along the creek, though much of the bottom lands are covered with willows and scrub; but for this it would make an ideal grazing country. There is a settler on the southwest quarter of section 14 who raises only horses, and another settler in the adjoining township east has a cow-camp on the northeast quarter of section 18, where his improvements consist of a log house about 15 x 20, a log stable about 18 x 35 and some fencing. He has a large quantity of hay cut in the valley which he feeds to his cows and calves in winter. No attempt at cultivation has been made, the valley not being adapted for raising crops except oats for green feed and possibly a few hardy vegetables. Wherever there are openings there is a luxuriant growth of grass which makes this township more particularly adapted for stock grazing.

All the townships within the limits of my last season's survey may be classified as grazing country.

In most portions of the district traversed, that is in the wooded country, there is an abundance of game. The deer are of the white-tailed variety. The wooded townships are the chief hunting grounds of the Stony Indians. A number of these visited my camp in township 22, range 3, with the hindquarters of four deer just killed. These, however, I did not buy, having at the time all the provisions necessary. These Indians were members of a large band spending their time hunting and killing deer wholesale. Unless some restrictions are imposed controlling this indiscriminate slaughter, it will not be long before the deer in this region are exterminated. In respect to fish, I should mention that nearly all the streams are well stocked. The principal variety being mountain trout, speckled trout, bull trout and grayling. There are also considerable numbers of mountain grouse and partridge, and in certain localities a few prairie chicken. While subdividing this last township, although the weather was very fine, the frost was severe, having penetrated into the ground the full depth of the pits, and I was compelled to abandon the mounding. The Indians also were anxious to return to the reservation before Christmas, and as the one month of two of them was up, I allowed them to leave on the 19th. After they had departed, I rounded up the work and broke up camp on December 20, paying off some of the men on the 21st. Those that took charge of the horses and outfit that had to be

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taken into wintering quarters, on December 24, were given checks for the several amounts due them.

I had previously made arrangements with Mr. Howe, near Priddis, who also has the winter cow-camps on section 18, in township 22, in range 4, for the wintering of my outfit.

I left Calgary on December 21, arriving home on the 25th.

I have the honour to be, sir,

Your obedient servant,

C. F. MILES, *D.L.S.*

APPENDIX No. 32.

REPORT OF A. D. MOODIE.

EXPLORATION OF THE COUNTRY BETWEEN ERWOOD, SASKATCHEWAN, AND THE PAS, KEEWATIN.

LAKEFIELD, ONT., November 30, 1906.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa, Ont.

SIR,—I have the honour to report that having received instructions on July 31 from your department to proceed to Prince Albert and there await further orders, I arrived at that point on Wednesday, August 1.

On August 6 I received my instructions, which were to organize a party for the purpose of exploring the region lying between Erwood, on the Canadian Northern railway, and The Pas, on Saskatchewan river.

I had considerable difficulty in procuring men and horses for the expedition, as well as a guide familiar with the country which I was to explore. There were no horses to be obtained in Prince Albert or on the Indian reserves in the immediate vicinity, and I was compelled to send to Duck Lake, forty miles distant, in order to procure them. I deemed it advisable to purchase six animals as we would be obliged to make up light packs, owing to the muskeggy nature of the country we had to traverse. I paid eighty dollars for one animal, eighty-five dollars a piece for three others and ninety dollars a piece for the remaining two. I also purchased a second-hand stock saddle for use in case of any emergency.

My instructions from your department left me a certain degree of latitude as to what route I should adopt, and as I had been unable to secure a guide in Prince Albert, but had heard of one living about twenty-five miles north of Tisdale named Thomas Ballantyne, I decided to go that way and interview him. We therefore shipped our heavier supplies by the Canadian Northern railway to Erwood, and proceeded with light packs across country to Mr. Ballantyne's homestead. I was successful in engaging his services, and found his knowledge of the district of the greatest value to me throughout my work.

It took us eight days to journey from Prince Albert to the Canadian Northern railway right-of-way, and as we had about ten days' provisions in hand on our arrival I decided to explore a certain portion of country before going into Erwood for the balance of our supplies.

The part that I explored first was that section lying between Leaf lake, on the east, and the Canadian Northern railway right-of-way on the west. Our work carried us as far north as the north end of Leaf lake and south to the main line of the Canadian Northern railway. My investigation of this section proved that it is mostly unfitted for agricultural purposes, mossy muskegs sparsely clothed with spruce and

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tamarack scrub, and gravel ridges covered with spruce and light poplar being the prevailing features.

The poplar is suitable for pulpwood, and amounts to about three million feet. It is practically of no use for any other purpose, the best of it being only about eight inches in diameter. Tamarack and small spruce amount to about one million feet. Spruce suitable for lumbering purposes grows in scattered quantities. It would be a generous estimate to assert that there are four million feet within this particular area.

Moose, caribou and bear are very numerous. We did not see many of the smaller fur-bearing animals, but I was assured by the trappers and Indians whom I encountered that they are very abundant.

The quality of hay in the marshes is distinctly poor. It is what is known as muskeg hay. Judging from the dislike of our horses to it, it is unsuitable for animals of a domestic breed. The only pasture for which our horses showed any partiality at all was the goose grass which grows in scanty patches on the gravel ridges already referred to.

Small streams are plentiful throughout this section, but as the land is low and of a marshy nature it would be impossible to erect dams on any of them for industrial purposes. They are, moreover, narrow, shallow, and full of rapids. Leaf lake is the largest body of water in this vicinity, with the exception of Red Deer lake, which, however, did not come within the scope of my investigations. It is a fine sheet of water, being about the size of a township in extent. On the northern and western sides, it is bounded by vast muskegs, but on the east and south the timber, the quality of which I have already stated, runs almost to the water's edge. Its waters are shallow, having an average depth of about eight feet. The lake contains a moderate supply of pike and sucker. On finishing this portion of my work, I decided to go to Etoimami, striking in by the well known pack trail that runs from Etoimami to The Pas.

Etoimami is eight and a half miles from Erwood, and we brought in our supplies from the latter point by means of our pack horses. We arrived in Etoimami on August 29, and having obtained our supplies, gave our horses a day's rest before setting out on the second portion of our expedition. Our supplies proving too bulky for our animals, I engaged a team which was travelling the same way as ourselves to cart six hundred weight of the goods as far as 'Thirty Mile Store.'

On September 1, we set out for 'Thirty Mile Store,' on the Canadian Northern route, my object being to first explore the country lying to the north of that point. My reason for doing so was that the season was well advanced, and there was danger of seriously damaging the horses' feet if frost settled on the muskegs. We arrived at 'Thirty Mile Store' late in the evening of September 2, and here I met Mr. Stewart, the leader of the companion exploring party, who was utilizing this point as his base of supplies. Prior to starting out in earnest on my work, however, I made a preliminary exploration of the ridges to discover if it was at all feasible to take horses through that country. Our guide had informed me that it was quite possible to do so, but I found that the off-take ditches of the Canadian Northern railway, while they had drained the western portion of the country, had flooded the eastern, and it was only when we arrived at Little Pasquia river that I found it possible to make use of our animals. I had been obliged to leave behind me at 'Thirty Mile Store' a man in charge of two of our horses, which were suffering from sore backs. In order to get our horses to Little Pasquia river we were compelled to make a succession of corduroy roads across the muskegs, which proved a laborious and lengthy undertaking. This work, combined with the exploration of the intervening tract of country, took us eighteen days to accomplish.

We started on our return journey from Little Pasquia river on the morning of September 21, but encountering an open muskeg, over which it was impossible to take the horses, and being, moreover, short of provisions, we cached our packs and left the

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animals to pasture on a ridge about eight miles from the station. By doing so we were enabled to reach 'Thirty Mile Store' at 5.30 p.m. the same evening. On the following morning September 22, I sent the men back to bring in the horses. To accomplish this they were obliged to make a long detour with the animals around the muskeg, an undertaking which occupied them three days.

Having spent a day in repairing pack saddles, &c., we started out from 'Thirty Mile Store' on September 26, with our full complement of men, animals and supplies. My destination was Little Pasquia river, where I intended to form my base of supplies, as I had discovered that that was the only point from which that part of the country could be suitably explored. I found a convenient base eighteen miles a little north of east of 'Thirty Mile Store,' and having cached our goods proceeded with my work of exploration.

The region is very similar in its characteristics to that we first explored, but the muskegs are more dangerous, whilst the timber is entirely of a scrub quality, being composed of dwarf spruce and tamarack.

Being shorthanded on account of the nature of the country, I took the opportunity on September 28 of hiring two Indians whom I found hunting in the neighbourhood. I paid them at the rate of two dollars per day for their services. On October 11 I despatched two of my regular party back to 'Thirty Mile Store' in charge of the horses instructing them to remain there till my return, and proceeded to explore the district on foot. The horses had been most serviceable as far as seven miles east of 'Fifty Mile Store,' but on reaching this point the dangerous quality of the muskegs, combined with the advent of frost rendered it hazardous to employ them any longer.

I concluded the exploration of this portion of my territory and returned to 'Thirty Mile Store' on October 18. On October 17 I had paid the two Indians their wages, the sum total amounting to eighty dollars. When I arrived at 'Thirty Mile Store' I received a letter from Mr. Stewart, informing me that he had brought from Erwood, a registered letter from the department to myself, and had left it in charge of a local merchant in Etoimami. I set out next morning for Etoimami and obtained the letter which contained a cheque for three hundred dollars, and which in order to have cashed I was obliged to transmit to Prince Albert.

The general character of the country from the north end of Leaf lake to The Pas and as far as thirty miles east of the grade which is already constructed to the latter point, is very similar in its features to that of which I have already informed you in this report. The timber however, is of somewhat better quality, and in greater quantity, one ridge alone which lies about half way between 'Thirty Mile Store' and Little Pasquia river, containing about two million five hundred thousand feet of spruce, suitable for lumber. There is, in addition on the same ridge, about three million feet of white and black poplar, and one million feet of tamarack suitable for ties and telephone poles. The average measurement of the spruce is about twelve inches, of the poplar seven inches, and of the tamarack nine inches. One particular spruce which I measured was one hundred and three feet in height and nine feet two inches in circumference.

It would be well to state here that what I have denominated 'ridges' throughout this report are in reality only slight elevations of from six to ten feet above the muskeg. There are only seven important ones in the whole region that we traversed, and these are from two to three miles long and about a mile wide on the widest part. There are also five smaller ridges which contain a certain amount of timber suitable for lumber, pulpwood and ties. The timber is composed of spruce, tamarack, white and black poplar and white birch.

Following are the dimensions and amounts of the timber on each ridge:—

Ridge No. 1.—Spruce suitable for lumber, diameter, ten inches; amount, eight hundred thousand feet. Tamarack suitable for ties, and piles, diameter seven inches; amount, one hundred thousand feet. Poplar suitable for pulpwood and building purposes, diameter, six inches; amount, five hundred thousand feet.

Ridge No. 2.—Spruce suitable for lumber, diameter, nine inches; amount, four hundred thousand feet. Tamarack suitable for ties and piles, diameter, nine inches;

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amount, fifty thousand feet. Poplar suitable for pulpwood and building purposes, diameter, seven inches; amount, five hundred thousand feet.

Ridge No. 3.—Spruce suitable for lumber, diameter, twelve inches; amount, two million feet. Tamarack, suitable for ties and piles, diameter seven inches; amount, fifty thousand feet. Poplar suitable for pulpwood and building purposes, diameter, six inches; amount, fifty thousand feet.

Ridge No. 4.—Spruce suitable for lumber, diameter, twelve inches; amount, two million five hundred thousand feet. Tamarack suitable for ties and piles, diameter seven inches; amount three hundred thousand feet. Poplar suitable for pulpwood and building purposes, diameter, eight inches; amount one million feet.

Ridge No. 5.—Spruce suitable for lumber, diameter, ten inches; amount, twenty thousand feet. Tamarack suitable for ties and piles, diameter, eight inches; amount, fifty thousand feet. Poplar suitable for pulpwood and building purposes, diameter, nine inches; amount, forty thousand feet.

For the convenience of your department I have marked these ridges on the sketch map of the district, bracketing under each ridge the amount of timber contained on each.

The land like the first section that I explored is utterly unsuited for agricultural purposes. Muskegs, either of an open nature, or covered with three or four feet of moss form the prevailing feature. Scrub spruce and tamarack abound throughout it.

Small lakes, partaking more of the nature of sloughs are very numerous; they contain no fish and the water in them is somewhat stagnant. Of streams, there are four between 'Twenty Mile' and 'Thirty Mile Stores.' Three of these rise in the Pasquia hills, two of them forming the head waters of Little Pasquia river. None of these streams are serviceable for lumbering or navigation as they are crooked, shallow and full of rapids. Their depth in summer runs from eighteen inches to two feet. The banks are alternately high and low, sometimes rising as high as three feet above and at others sinking almost to a level with the water. All these streams flow to the east, the average rate of their currents being about two and one-half miles an hour. Their width from bank to bank is at the most sixteen feet. The beds are a mixture of shale and gravel.

What timber there is, in the district, lies within easy access of the railroad, none of it being more than ten miles distant from the Hudson Bay railway. Owing, however, to the impossibility of driving the logs down the waterways, which in addition to their shallowness, flow the wrong way for the purposes of transportation, it would be necessary to draw the logs out in winter, unless the alternative plan was adopted of erecting a portable mill on the limits and thus saving the carrying of much waste material to the railway.

Little Pasquia river is the most important river in this section. In summer, like all the other streams it is very shallow and crooked. Rapids are numerous and the current very swift. It is, however, perfectly suitable for lumbering purposes, as in the spring of the year the water is amply deep enough for driving timber. The rapidity with which the river fills up may be judged from the fact that after a heavy rainfall in September, its depth increased twenty-two inches, with the result that a large portion of the country around its mouth was badly flooded. The width of the river is about forty feet. Dams cannot be erected anywhere along its course owing to the lowness of its banks.

The quality and quantity of the timber which adorns both banks of Little Pasquia river constitute its most important features. Whilst there are only two narrow fringes of timber varying in width from one hundred to two hundred feet, these extend from twenty-five to thirty miles up both sides of the stream and contain altogether about five million feet of good marketable spruce, tamarack, and poplar. The tamarack in comparison with the other woods, is scattered, but all the timber is of excellent quality

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and not to be excelled in any other part of this region. The spruce averages from ten to twelve inches in diameter, the tamarack about eight inches, and the poplar about the same. In one particular spot on the east side of the river there is a large patch of white poplar, covering an area of nearly four square miles which is really of magnificent quality. The timber along both banks of Little Pasquia river is very scattered, which will account for the small estimate I have placed on that particular area. The tamarack is mostly suitable for ties with a six inch face, or for piles. I estimate its amount at two hundred thousand feet. In addition there are about one million feet of poplar, suitable for pulpwood or for building purposes. On the west side of Little Pasquia river I discovered that a large section of land had been burned over, utterly destroying all the timber that had been upon it. There is along both banks, however, a considerable quantity of fallen timber, which is dry and sound and admirably fitted for firewood.

The country lying to the east and north of Little Pasquia is composed entirely of muskeg and is covered with spruce and tamarack scrub. There are no open muskegs and the only place where hay can be obtained is on either bank within a short distance of the river. The character of the country can be best judged from the fact that for days together we were compelled to wade in water to our knees. A unique feature of all the region that I traversed is that good timber is to be found only on ridges such as I have already mentioned. In this particular section there are no ridges whatever.

There are one or two small and insignificant lakes which scarcely merit mention. The streams which run into Little Pasquia river from the east are shallow, crooked and narrow, and are merely so many rivulets taking off the surplus water of the muskegs.

The same species of game which I have mentioned as abounding in the other sections are also to be found here in large numbers. Otter and mink haunt all the streams.

The nature of the climate is hard to determine as I was, of course, only in the country during the summer months. I noted, however, that there was an exceptionally heavy rainfall. The heat was intense during August and September, but there was hardly a night during the entire period that we did not experience a few degrees of frost. After a heavy rainfall, about August 20, there was a frost so severe that it froze the edges of the lakes and streams. By the end of September the grass on the muskegs was frozen so badly that it was neither palatable nor nutritious for our animals.

It was not included in my instructions to make any report on the village of The Pas. For the information of your department, however, I made inquiries of Mr. Edwards, who is in charge of the Church of England mission at that point, and gleaned from him the following facts regarding it. The population is about five hundred, including Indians. Most of the inhabitants are members of the Church of England. The village consists of a few half-breed houses, two stores and the Church of England mission. The church is a frame building and holds a congregation of one hundred and fifty. There is a resident doctor.

The Canadian Northern railway to Hudson bay runs through a muskeg country nearly the whole way from Etoimami to The Pas, a distance of eighty-nine miles. The engineers discovered that the muskeg of this particular section rested on a solid foundation of limestone gravel from between three to six feet below the surface and they claim that once the muskeg is drained a good roadbed will be obtained. I need not, therefore, dwell on the desirability of any other route for the Hudson Bay railway.

I am glad to report, in regard to the health of my party that not half an hour's illness was experienced by any one of us during the entire trip.

We were unfortunate enough to lose one of our horses during the early part of our work. The hard travelling and scarcity of feed being apparently the cause of its death.

We concluded our work on October 26, having worked back from Little Pasquia river to Etoimami. We were compelled to wait at Etoimami till Tuesday, October

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30, owing to the lack of a car for our horses. On October 30, I shipped the horses in charge of one of my men to Prince Albert, the rest of us following by the first passenger train early on Thursday morning. We arrived in Prince Albert on the same evening. I paid one man off on Saturday, November 3, as soon as I received a telegram from your department to disband the party, but kept one on to take charge of the horses till the sale which took place on Monday, November 5. Under separate covers I have forwarded the bill of sale of our horses and outfit together with a statement of my accounts. I have also forwarded a copy of my diary covering the whole of our itinerary.

Trusting that the report will meet with your approval.

I have the honour to be, sir,

Your obedient servant,

A. D. MOODIE.

APPENDIX No. 33.

REPORT OF W. F. O'HARA, D.L.S.

SURVEYS AND RESURVEYS IN CENTRAL AND SOUTHERN ALBERTA.

OTTAWA, ONT., March 25, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour in accordance with my instructions, to submit the following general report upon my surveys of the season of 1906.

I left Ottawa early in the month of May, for the province of Alberta, taking the main line of the Canadian Pacific railway.

On May 12 I arrived at Calgary where I remained for a day or two, purchasing part of my outfit, and hiring part of my party. I then proceeded by rail to Lacombe where I hired the rest of my party, and completed the purchase of my outfit and supplies.

Until May 15 little or no rain fell, and the whole country was as dry as match wood. Many farmers were fearing a dry year, which would have been very disastrous to the country, but on the morning of the 15th rain began, and the sun was scarcely seen until the 31st, when the weather cleared. The wind blew from the northeast during that period, which is the rainy quarter in the province of Alberta. The whole country was flooded and the roads were impassable for some time.

In consequence of the state of the roads, I chartered a car from the railway company to move my outfit and supplies, from Lacombe to Nevis, about forty miles east. By this means I was enabled to get within about twenty miles of the scene of my field operations. The roads and trails at this distance from the railway were in much better condition than those nearer the settlements, and were passable. I then proceeded southerly by the roads and trails, to township 34, range 21, west of the fourth meridian, where I commenced my season's work. It consisted in this locality of correction surveys, which were not originally executed with the degree of precision required by the department.

I arrived here on June 6, and remained until September 17, making the necessary corrections in townships 32, 33, 34 and 35, range 21, and townships 32, 33 and 34, range 22, all west of the fourth meridian.

The land in this region consists of black loam from two to six inches deep, with a clay subsoil, and is well adapted for farming.

I then proceeded to Cygnet lake, about eight or ten miles west of Red Deer, in

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township 38, range 28, west of the fourth meridian, and township 38, range 1, west of the fifth meridian, the latter line passing nearly through the centre of the lake. I made a complete traverse of this body of water, also of the old shore line, the waters having receded, and produced the subdivision lines of the townships across those portions of the lake which had dried up. This work was required in consequence of applications having been made for lands, which the latest plans showed were entirely covered with water. This is a well timbered region, with poplar up to twelve inches in diameter. The soil consists of rich black loam from six to twelve inches, with a clay subsoil. The country is well settled, and the land is nearly all taken up and improved. The farmers all seem to be in a prosperous condition, judging from their fine buildings, good crops and large herds of cattle. I completed everything that was required here on October 8, and left for Red Deer on the 9th, arriving there about noon of the same day. On the 12th, I chartered a car from the Canadian Pacific railway, and shipped my entire outfit to Macleod, in the southern part of Alberta, arriving there on the 13th. On the 16th, I drove to Pincher Creek, a small town about twenty-seven miles southwest of Macleod.

I spent a day in reorganizing and purchasing supplies, and left on October 18, arriving at township 5, range 3, west of the fifth meridian, about four o'clock in the afternoon of the same day. On the day following fourteen inches of snow fell, the first severe storm of the season in this part of the province. My work consisted here of the subdivision of the township. The weather was so severe and storms so frequent, that I succeeded in surveying only a few miles. The country is heavily timbered with fir, pine and spruce, and differences of altitude of from 1,000 to 2,500 feet make surveying operations not only difficult but exceedingly slow. There is evidence of the presence of coal and petroleum in this township; operations for the latter are now in progress. I remained here until November 28, and returned to Pincher Creek upon that date. I discharged my party, sold my outfit, and returned to Ottawa, arriving here on December 5.

I have the honour to be, sir,

Your obedient servant,

W. F. O'HARA, *D.L.S.*

APPENDIX No. 34.

REPORT OF A. W. PONTON, *D.L.S.*

SURVEYS IN NORTHERN ALBERTA.

MACLEOD, ALBERTA, November 3, 1906.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of my survey of block outlines and base lines in the Lac LaBiche and Athabaska districts, under your instructions of November 20, 1905.

Leaving Macleod on January 6, 1906, I proceeded to Edmonton, where a party was organized, supplies and outfit purchased, and arrangements made to have outfit and supplies freighted to Lac LaBiche. My transport equipment, turned over to me by Mr. P. R. A. Belanger, inspector of surveys, consisted of one team of fair sized horses, and ten pack ponies, with proper equipment of saddles, &c.

Starting from Edmonton on January 13, I reached Duck lake near the point where my work commenced on the 21st. Owing to lack of good sleighing, it was found

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necessary to follow the ice road on the Saskatchewan to a point fifteen miles below Victoria, and from there to strike the Lac LaBiche road at Redclay creek.

Work was commenced on January 23, and until May 21, when I closed on the fifth meridian, weather conditions proved favourable, and no untoward circumstances occurred to interrupt the ordinary daily routine,—consequently good progress was made.

Owing to the light snow fall, and a period of intense cold which occurred in the early winter, frost penetrated the ground to an unusual depth for wooded country, and it was soon discovered that mounding could be done only at excessive cost and would also delay the projection of lines. I therefore decided to leave the mounding until the projection of lines was completed, and then, with a reduced party, mound back to my starting point. This plan was also rendered necessary by the small number of pack-ponies at my disposal being inadequate for the transportation of a party of the usual number of men. As it turned out this plan proved in the end the best that could have been followed, the mounds being constructed at less cost, and more strictly in accordance with regulations than would have been possible with frost in the ground.

Mounding back commenced on May 22, and the starting point of my survey, at the northeast corner of township 64, range 13, west of the fourth meridian, was reached on June 18. Between June 19 and 25 I returned by way of Victoria to Edmonton, where my party was paid off, and all government property in my possession handed over to Mr. P. R. A. Belanger, inspector of surveys.

Following is a description of the country through which I passed :—

The country in the neighbourhood of Lac LaBiche is generally wooded, poplar being found on the high land, and spruce in the swamps. The spruce timber available is sufficient to supply all lumber required for early settlement, but is too scattered for commercial purposes. A portable sawmill would best meet local requirements. The soil is generally a good clay loam, which becomes lighter and more of a sandy loam, as the lake shore is approached. Cut banks were observed at different points on the lake shore, showing clay loam forty feet in depth without stone. Small scattered areas have been partly cleared by fire, and these clearings will eventually facilitate settlement. Country of this description has been much favoured by Russian and other foreign settlers during recent years. Whitefish and ground game will provide the poorer class of settlers with a plentiful supply of food during the initial period of making a farm. Lac LaBiche as seen during the winter months is impressive, and its attractiveness during the summer must eventually lead to its becoming a popular pleasure resort.

The country lying between the lake and the fifth meridian is not attractive, and settlement will be slow. Lac LaBiche river offers some good land along its banks, but as it is not navigable, access is difficult.

(Note.—Descriptions of the townships surveyed have been taken from this report and published as part of Appendix No. 46.)

No trace of minerals of economic value were observed in the country passed over and rock in place seems entirely absent. Game, while not numerous, is still sufficient to assist the Indian and half-breed hunters through the winter. Lynx, as well as rabbits, were especially numerous. Partridge and prairie chicken were seldom seen. Between the Athabaska river and the fifth meridian signs of moose were very frequent, and for the past several years they have been numerous in the vicinity. No water-powers were observed, but Lac LaBiche river might furnish power if the water supply is sufficient at all seasons.

The winter climate in the neighbourhood of Lac LaBiche and Athabaska Landing appears to be similar to Edmonton, and although periods of low temperature occur, their duration seldom extends beyond a week. Good dry wood fuel abounds and cold weather causes little inconvenience to residents or travellers.

I have the honour to be, sir,

Your obedient servant,

A. W. PONTON, *D.L.S.*

APPENDIX No. 35.

REPORT OF W. R. REILLY, D.L.S.

RESURVEYS IN SASKATCHEWAN.

REGINA, SASK., February 27, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa, Ont.

SIR,—I have the honour to submit the following general report concerning my survey operations in the field from May 21, 1906, until February 5, 1907, according to your instructions dated at Ottawa, April 21, 1906, and subsequent instructions.

Your instructions were for me to take the transport outfit stored with Mr. Chas. H. Seymour near Saskatoon. On receiving your instructions I wrote Mr. Seymour in reference to the condition of the horses and other information about the outfit. I did not get an answer to my letter (which was some months after, returned to me through the dead letter office). After waiting several days I sent a man to Saskatoon to look up the outfit but no trace of Mr. Seymour could be found until I wired you and got the location of Mr. Seymour's homestead which was over thirty miles from Saskatoon.

I wired the man I had sent to Saskatoon to hire a livery and drive out after the outfit. On receiving word that they had arrived in Saskatoon, I left Regina on May 21. On the following day I organized my party and procured my supplies in Saskatoon.

The work throughout the season was either retracements or resurveys of townships that had been surveyed in the early eighties and have been reported on by the surveyor of each township. At the time of the original surveys the land was in the virgin state and far removed from the likelihood of immediate settlement. Its productiveness was then conjectured not demonstrated. It did not then present to the surveyor the same appearance as it now would, for settlement has changed the blank aspect of the country and cultivation has shown that excellent crops can be grown in favourable seasons, not only on first-class land but on ground that has been considered to be low grade.

As the country becomes more thickly settled the tendency is to take up the poorer class of homesteads. This is not often done by parties who pretend to make homes of them, but more by those who have purchased adjoining land, by whom a quarter is considered poor indeed if it is not worth homesteading.

The horses had wintered fairly well, but they were not in a condition to stand much driving until they had improved. So I decided to spare them, and began work in township 35, range 6, west of the third meridian, the nearest work to Saskatoon. In this township I could do but little driving on account of the river and scrub on the lines. By the time I had completed the township the horses were in good condition.

I moved into this township on May 23. The weather then was warm and bright, grass growing rapidly, trees budding, seeding well advanced, trails in good condition and the country presenting a fine appearance for the season.

I made a retracement and restoration survey of the outlines and interior meridians of this township, and a traverse of South Saskatchewan river in the southeast quarter of the township, which cuts sections 4, 3, 2, 10, 11, 12 and 1.

I found the majority of the old markings but many of the iron section corner posts were missing, and those found were in bad condition and not fit to be used. The wooden posts in the quarter section corners were nearly all destroyed. Mounds in most cases were unmistakable when found, but owing to the uneven surface of the ground, scrub on the lines and all traces of old lines being blotted out by fires and new growth, it was only by re-running the lines that a large number of these could be found. In the retracement of lines in this township and all retracements during

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the season's work, I resorted to random lines as being the most practical and expeditious way of carrying on the work.

The surface soil and general character of this township is varied. The southeast and northeast corners of the township are broken by the south branch of Saskatchewan river, which enters in and runs through sections 3, 10, 11, 1 and out in section 12, entering in again and running through section 36.

The east part of the township is flat, the west part from rolling to hilly, the division is marked by a range of hills skirting the flat from the southeast corner of section 5 to the northwest corner of section 35. Moon lake, a shallow body of fresh water, cuts sections 10, 14, 15, 16, 21, 22 and 23. It has low marshy shores with reeds extending far out into the water. It is considerably higher than the river into which it could be easily drained.

Generally speaking, a large portion of the southeast quarter of the township and the sections along the river are covered with a dense growth of red willow, poplar and balm of Gilead. The willow is large enough for fence posts, the poplar and balm of Gilead for fuel and rough buildings. The remainder of the township is dotted more or less with clumps of poplar and brush, but in few cases is there anything larger than six to eight inches in diameter. The soil of the flats is mostly a good clay loam. The upland in the northwest quarter of the township is a good sand loam running into light sand in the southwest quarter.

Nearly all the homesteads in the north half of the township are taken up, and some odd quarters have been bought up in the flats. It is but recently that the land has been settled on, but excellent progress has been made. Crops were looking well and gave promise of a good harvest. The greater part of the land is best adapted to mixed farming. The southwest quarter of the township is light, but excellent for grazing. Frequent rains occurred during the survey and the climate was all that could be desired.

I finished the survey of the lines on June 26 and started for townships 33 and 34, ranges 1 and 2, west of the third meridian, a block of four prairie townships.

I crossed the river at Saskatoon, where half a day was spent in procuring supplies and ferrying across the river. I arrived in township 34, range 2, at noon on June 28.

My instructions were to make a retracement and restoration survey of these townships. This work I proceeded with in township 34, range 2, until July 6. The original subdivision was very poor, consequently lines were very crooked and distances unequal. A local improvement district had been formed out of these four townships. It seems that for some time previous to the beginning of the survey the matter of a correction survey for these townships had been discussed in council and throughout the district. So when it was found that I was not making a new survey, only establishing old corners, general dissatisfaction seemed to prevail. A meeting of the council was called and you were wired concerning the disapproval of the survey. I wired you briefly the situation and received conditional instructions to make a resurvey of these townships, particulars of which have been sent to you in subsequent correspondence.

I made a retracement of the east boundary of townships 33 and 34, range 1, the east boundary of township 33, range 3, the north boundary of township 32, ranges 1 and 2, and a resurvey of all other outlines, interior meridians and cross lines in these four townships, destroying all old monuments. A traverse was made of all water areas. Many minor changes were made in the positions of the monuments and some gross errors corrected, the greatest being in township 33, range 2, where all the monuments (south of the lake in sections 19 and 20) on the east boundaries of sections 6, 7, 18 and 19 were over 13 chains in error. The positions of all old monuments are marked in the field notes, which will give in detail the changes made at every corner.

The general features of each township are similar. The surface is prairie, mostly rolling, parts hilly, all more or less cut with small lakes, ponds and grass sloughs, the

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water mostly alkaline. Excellent well water is got in many places by digging from 10 to 20 feet. The soil is generally a light clay loam running into sand loam in many places, and mostly alkaline in the low ground.

The district is new, being settled only about three years, but it has all the appearance of a much older settled country in regard to cultivation. A large amount of breaking has been done and considerable land is under crop, mostly wheat with a large proportion of oats and a small amount of barley. All presented an excellent appearance while growing and promised a large yield per acre. Some slight damage was done by hail. Hay is not plentiful, but a considerable quantity can be cut around many of the sloughs and in some places on the upland.

The surveyed line of the Grand Trunk Pacific railway running westward, enters township 33, range 1, at the quarter on the east boundary of section 36, crossing township 34, range 1, diagonally in a straight line, which is continued into section 33, township 34, range 2, where a slight deflection is made to the south. It leaves this township in the southwest quarter of section 31. A side track has been laid out on section 28, where a station is likely to be built. The building of this road has added fresh impetus to the district. Land has advanced rapidly and a large number of good buildings have been built this season. A number of good school houses, which are also used for church purposes, were built before I began the survey, township 34, range 2, having two, township 33, range 2, having one, and township 33, range 1, having two. There is a nice small Roman Catholic church in township 34, range 1.

The season for farming was exceptional, with abundance of rain, which produced both crops and grass, with no frost, much sunshine, little damage by hail and fair harvest weather. From present indications grain growing will for some time be the chief industry, but the district is well adapted for mixed farming, as grain, cattle, hogs and horses, all do exceptionally well. Such class of farming is the best kind of insurance against the uncertainties of farming in this country.

In the retracement of the base lines across ranges 1 and 2 and the third meridian on the east boundaries of townships 33 and 34, I found the lines straight and the chaining excellent, especially on the base where our chaining scarcely varied a link to the mile. This is so different from the subdivision work done in these townships that it shows that not even ordinary care was taken with the work.

On August 25 I finished the traverse of lakes in township 34, range 2, which completed the survey in this district. On the same day I received your instructions dated August 16 to examine and report on the necessity of a survey of township 34, range 6, west of the third meridian. On August 27 I took one man with me and drove into this township by way of Saskatoon and made an examination which was reported to you at the time. In the meantime my outfit moved into township 37, range 1, west of the third meridian.

Township 37, range 1 and townships 38, ranges 1, 2 and 3, west of the third meridian formed the next district surveyed. I made a retracement and restoration survey of the outlines and interior meridians in these four townships, also a traverse of a number of water areas, which differed materially from the original surveys. These townships are open prairie. Many minor errors were found. The survey was perhaps honestly done and was a superior class of work to what was done in townships 33 and 34, ranges 1 and 2. I found nearly all original markings but the majority of them were nearly blotted out. Townships 37 and 38, range 1 and township 38, range 2, were posted with wooden posts which were nearly all destroyed. Township 38, range 3 was posted with iron posts, but few were found.

Township 37, range 1, is very hilly on the south and west sides rolling to hilly on the east and north sides, depressed in the interior and much broken by water areas.

In township 38, range 1, the two tiers of sections on the north side are almost flat, the balance of township is rolling to hilly, with several water areas.

Township 38, range 2 is cut diagonally by a range of hills from section 6 to 36, the northwest part is rolling, the southeast part hilly and stony.

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Township 38, range 3 is rolling and stony in the northwest corner. The greater part of this township, the rolling and the flat land in townships 38, ranges 1 and 2 and a number of quarter sections in township 37, range 1, are first-class farming lands. The soil is either a rich sand or clay loam and produces good crops. The soil of the hilly ground is good but it is best adapted for grazing. Where it is stony, it is fitted for little else. Water is plentiful, mostly fresh. Hay is rather scarce but a limited quantity can be cut in each township.

The main line of the Canadian Northern railway just skirts the north boundary of township 38. The town of Vonda is in range 1, Aberdeen in range 3, with elevators at each place. The settlement is new but developing fast. Wheat is the principal crop.

I finished the survey of these townships on October 16. The mounders had several lines to do, so I put all hands at mounding and I took advantage of the time to investigate an error on the east boundary of section 34, township 31, range 9, west of the third meridian, according to your instructions dated August 27. The particulars have been reported to you. The mounding was finished the day I returned to camp, October 23.

On the following day I started north for the next work in townships 41 and 42, ranges 27 and 28 west of the second meridian, camping on the ground in township 41, range 28, on the 25th.

I made a retracement and restoration survey of the outlines and interior meridians in townships 41 and 42, range 28, and a retracement of the outlines and interior meridians in townships 41 and 42, range 27. The mounding of these two townships as before reported is not done.

These townships are much different from the prairie country to the south. The surface is from rolling to hilly more or less broken by hills and water areas and dotted with clumps or large stretches of poplar. Water is plentiful but more or less alkaline. The soil is very good in the greater part of the township. With very few exceptions this district is settled with Galicians. Nearly every homestead has been taken up in these townships and more or less improved. A number have quite large areas in crop and threshed a thousand bushels of wheat this season. The settlement is new but good progress is being made. The dwellings put up by these people are substantial and warm. They are built of logs, one story high, with thatched roof; the walls are plastered over inside and out with clay and then whitewashed. A flour mill and store in township 42, range 26, is more or less patronized. The greater amount of trading is done in Rosthern, on the Prince Albert branch, and Vonda on the main line of the Canadian Northern railway.

The weather during the progress of the work was fine for the season. The ground froze up about November 20. The first snow of the season, a light flurry, fell on November 1. The snow fall was light until Christmas, when a heavy storm increased the depth to 14 inches.

I finished the work in this district on December 29. On the following Monday I started by way of Vonda, Aberdeen and Saskatoon for township 34, range 6, west of the third meridian, to make a retracement of the lines in this township according to your instructions dated September 13, 1906. Owing to unbroken roads, heavy snow drifts and extremely cold weather it took one week to make the trip and get camped in this township. The outlines on the east and the west sides and the interior meridians next these outlines are on hilly prairie. Heavy snow drifts made it impossible to locate mounds on these lines. The three meridian lines in the centre of the township could not be run with satisfaction except when frozen up. I found original corners from which I located the corners on the north boundary of townships 33 and 34, governing these lines. I surveyed these lines and the cross lines connecting them, planting all quarter and corner posts but no mounds were built. I traversed a body of fresh water in sections 4, 5, 8, 17 and 16, known as Pike lake, also both banks of the river and the islands in it. Extra heavy cutting was done through willow jungles on these lines. All lines not run being on high ground can be run

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best in summer time when markings can be found if they exist. From the many discrepancies shown on the plan and the absence of all markings or old cuttings I do not think these centre lines were run in the original subdivision.

A description is given in the field books for each township surveyed during the season.

Searching for old markings and noting their positions made the work much slower than running original lines. During the season's work seven hundred miles of section lines were run and over one hundred miles of traverse work. Nearly one hundred miles of lines were heavy cutting.

I quit work February 2, arriving in Saskatoon with my party on the 4th. I paid off the men the following day. The horses were let out for winter with Mr. T. W. McNeil, on section 14, township 33, range 6, west of the third meridian. Transport goods were stored with J. F. Cairns, Esq., Saskatoon.

The railroad being blocked, I was delayed in reaching home until Saturday, February 9.

I have the honour to be, sir,

Your obedient servant,

WM. R. REILLY, D.L.S.

APPENDIX No. 36.

REPORT OF J. F. RICHARDS, D.L.S.

SURVEYS IN NORTHEASTERN SASKATCHEWAN AND NORTHWESTERN KEEWATIN.

STE ANNE DE LA POCATIERE, March 18, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of the surveys made by me during the last session at Cumberland House, at The Pas and at Big Eddy, following your instructions (file No. 627210), dated May 11 and those following dated August 3 and 30 last.

I left Ottawa on June 8 for Cumberland House and reached Winnipegosis on the 12th, which place I left the same day by the N.W. Fish company's boat for High Portage on Cedar lake, arriving there on the evening of June 13.

On June 16 I took the *Cumberland*, one of the N.W. Fish company's boats, for Cumberland House, arriving there on June 18.

Cumberland House is situated on Cumberland island, which is a small island near the southeast bank of Cumberland lake, about six miles north of Saskatchewan river.

The commerce of Cumberland, especially in furs, is considerable. The Hudson's Bay company has an important post here, and Revillon & Co., has built and established stores there during the course of the summer. A school and a Catholic chapel are found there. The Catholic church and the residence of the Catholic missionaries are situated at the southeast corner of the Hudson's Bay company's reserve, quite near the south limit of the said reserve.

At about three-quarters of a mile farther on, towards the south, is the Indian reserve on which there is a school and a chapel under the direction of the Rev. Mr. Settee, Anglican missionary.

Cumberland, including the Indian reserve, has about 600 inhabitants, of which two-thirds at least, are of Indian origin. There are only a couple of white families there, the rest being English and French half-breeds, the English half-breeds predominating. The language generally spoken there is Cree, although several of the half-breeds understand English, and six or seven amongst them understand French. These

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half-breeds hunt, fish or work for the companies mentioned above.

In the event of hunting and fishing coming to an end or decreasing sensibly, this population would suffer the greatest privations. The price of merchandise of all kinds is excessively high.

The abuse of alcoholic liquors makes sad ravages here, in spite of the efforts of the Catholic missionaries, and those of other religious denominations who combat this curse.

These half-breeds are generally hospitable, very intelligent, of an independent character, very pacific and very honest, but improvident, troubling little about the future, and living only from day to day. They have a repugnance to ordinary manual labour, especially to agricultural work. They are excellent hunters, good fishers, and good guides. Their power of endurance is remarkable, as shown in the long and difficult trips which they have to take in canoes, on foot or with dogs, according to circumstances.

The land in the neighbourhood of Cumberland House, that of the Hudson's Bay company excepted, is damp, swampy and of little use for farming. The small extent of arable land which is met there is moreover very rocky and very difficult to improve. The inundations of Cumberland lake and of Saskatchewan river are sometimes so great and the country is in general so flat, that cattle raising would have little chance of success.

There are no stone quarries, nor is there any water-power there. There is wood everywhere, chiefly pine and poplar, with some birch, but it is too small for lumbering.

Apart from those made on the Hudson's Bay company's reserve, the clearings are of very little importance. None of the clearings are more than fifteen acres in extent, and not more than one-quarter of this is well cultivated.

The summer is short, but hot, and the vegetation is extraordinarily vigorous and rapid. Potatoes and vegetables of all kinds grow and ripen well. It is claimed that it would be the same for barley, oats and even wheat.

The last frosts come in June and the first in September. Winter commences about November 1, and spring towards April.

Fish abound, especially sturgeon and whitefish. Wild duck and bustard are found most plentifully, but the stag, elk, bear, otter, bison, muskrat and marten all abound.

Almost all the land occupied by the half-breeds is covered with wood, in the midst of which their houses are found here and there and sometimes very near to each other. It took some time to settle the position of the houses and to determine the general arrangement of the lots.

As the original limits of the Hudson's Bay company's reserve have been obliterated or lost, re-establishment has become necessary to settle the front of the half-breeds' lots. The road which I surveyed to lead to the Catholic mission at Bigstone river is not exactly in the same place as that mentioned in the order-in-council accompanying my instructions, because this latter road for the most part, passes on the Hudson's Bay company's reserve.

In order to leave, in as far as possible, the half-breeds or others, in possession of the land which they occupy, I have been obliged to make lots irregular and of different areas.

It was only after several conferences and minute explanations that they understood what it was a question of doing, and that I was able to adopt the method which gave them the most satisfaction. I have settled thirty-seven lots which, except three or four, were already occupied or claimed.

I have retraced the limits of this portion of the Indian reserve granted by the Department of Indian Affairs. The southern boundary of this portion has a length of 80·80 chains. Its western boundary is 78·90 chains. I have taken the bearings of Cumberland lake from the east extremity of the southern boundary of the Indian reserve to the southern boundary of the Hudson's Bay company's reserve, then the bearings of Bigstone river from the western boundary of the Hudson's Bay company's

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reserve to the western boundary of the Indian reserve. The sketch attached shows all the surveys.

I finished the work at Cumberland August 3. On Monday August 6, I left Cumberland for the Pas on one of the Hudson's Bay company's boats, where I arrived in the afternoon of the same day.

On arriving at The Pas I met Mr. Wickham, Mr. Finger's agent, with whom I immediately visited the places to be surveyed, accompanied by Father Boisson, Oblate missionary, and Dr. Larose, as interpreters, and by some of the half-breeds who occupied land adjacent to that which Mr. Finger wished to obtain.

It was decided between Mr. Wickham and myself, that the work of surveying should begin the morning of the next day, but I could not proceed to survey before the 8th, i.e., Wednesday, seeing that the day before Mr. Wickham had not been able, he said, to find any person to help me. The 8th, 9th, 10th and 11th of August were employed in surveying the land of Mr. Finger and the lands of the half-breeds, which were adjacent to his. I was helped by three men only, as Mr. Wickman claimed that he could not find more. Sunday, August 12 I took advantage of a boat which left The Pas for High portage, where we arrived in the afternoon of the 14th, after a very stormy voyage on Cedar lake.

On the evening of August 15 I took one of the Northwest Fish company's boats for Winnipegosis, where we arrived about noon on the 16th. There I found your instructions addressed to me at the post office, dated August 3, ordering me to return to The Pas if I had left there, in order to make a settlement survey at Big eddy. The next day, the 17th, I left Winnipegosis for The Pas, where I arrived on the evening of the 23rd.

On August 25 I met one of the half-breeds from Big eddy named Henry Cook, at The Pas, who had come at my express request to confer with me about the settlement, which could be made at Big eddy. Mr. Cook represented the half-breeds at Big eddy.

The Big eddy settlement is situated to the north of Saskatchewan river on the back line of The Pas Indian reserve. It is therefore separated from Saskatchewan river by the Indian reserve. It is the only place at Big eddy, outside of the Indian reserve, where it is possible to build houses on land which is somewhat dry and beyond the reach of floods. I have surveyed at Big eddy eighteen regular lots each two chains in length and having an area of two acres. Sixteen half-breeds each claim one of these lots. No improvements of any consequence have been made on any of these lots, except on lot 14, where there is the beginning of a house.

I have also taken the bearings of a part of the point named Big eddy point, which is opposite the settlement on the south side of Saskatchewan river. On September 8 in the forenoon, several of the Big eddy half-breeds came to meet me, and again begged urgently for the survey of Big eddy point.

The part of this point comprised between the red line 10 and 14 on the attached sketch and Saskatchewan river is claimed by these half-breeds, that is, they desire to have the use of it gratis, as land for hay. Naturally I have not been able to guarantee them either the ownership or the use with a free title of this point. I have surveyed it so as to make their claims known to the department. Henry Cook and some other half-breeds have already occupied this point. There are still three houses to be seen, which they built formerly there and which they had to abandon a few years ago on account of the floods from Saskatchewan river. They place great hopes in this point and cannot believe that it can be refused them. They also wish to have a free title as proprietors of the settlement lots.

It can be said that there is practically no cultivable land at Big eddy.

The general observations made about Cumberland apply here. However, alcoholic liquors, so en vogue down there are used only very little or not at all here.

I finished the survey of Big eddy on September 19, and went to The Pas the same day, which is four miles to the east. I immediately commenced the survey of the settlement of The Pas.

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The settlement of The Pas is situated on the south bank of Saskatchewan river. It is bounded on the east by that part of the Indian reserve, designated under the name of block B, and on the west by that other part of The Pas Indian reserve, designated under the name of block A.

I made ten lots there. Lots 1 to 6, inclusive are occupied and claimed by the half-breeds. Lots 7 to 10, inclusive, are vacant or rather are those which Mr. Finger could obtain without any person having anything to complain about.

Except a few little pieces here and there on the bank of Saskatchewan river, all these lots are practically unfit for cultivation unless extensive draining operations are carried on. The rest is a plain covered with a bed of moss from twelve to twenty-four inches in depth, appearing to extend towards the south beyond the settlement for some distance. This plain is moreover covered by a black or red pine timber from three to eight inches in diameter.

The half-breeds have made some improvements on their lots, but altogether they have only a very small area on each lot in a state of cultivation or as a garden.

The Pas half-breeds, like those of Big eddy, are almost all of English origin. The language spoken is Cree.

The population of The Pas, counting the Indians of the reserve, is about 500.

The means of subsistence are the same as at Cumberland.

The Pas is the seat of an Indian agency, of which Mr. Fisher has the direction. It is at The Pas that Dr. Larose lives, the physician named by the government for the care of the Indians. There is a school built and maintained by the government for the Indians.

Almost the whole population professes the Anglican religion which has as missionary the Rev. Mr. Edelbard. The Anglican chapel is a good sized building.

One of the branches of the Canadian Northern, a railway which runs towards Hudson bay, ought to reach The Pas during the course of the summer.

The Hudson's Bay company has an important post here under the direction of Mr. Shalcrosse.

I finished the settlement of The Pas on October 12. I next surveyed the lands of the Anglican mission, which I finished on October 23.

At this date the service of the Hudson's Bay company's boats as well as that of the N. W. Fish company had ceased, so it was impossible to return by the water route. I was obliged to wait for the winter roads, and it was not until November 22 that it was possible for me to leave The Pas. I made the distance which separated me from the railroad by a dog train.

I left Winnipeg on December 5, and reached Ottawa on the 8th, and again left on the 11th for Ste. Anne de la Pocatiere.

I contracted la grippe while coming from the Northwest, and after returning to my family I was unable to do any work whatever for over two months. I am now almost well and will finish my returns as soon as possible.

Hoping that you will be satisfied with this report which I respectfully submit to you.

I have the honour to be, sir,

Your obedient servant,

J. F. RICHARD, D.L.S.

APPENDIX No. 37.

REPORT OF JOS. E. ROSS, D.L.S.

SURVEYS IN RAILWAY BELT, KAMLOOPS DISTRICT, BRITISH COLUMBIA.

KAMLOOPS, B.C., March 23, 1907.

E. DEWILL, Esq., LL.D.,
Surveyor General,
Ottawa.

Sir, I have the honour to submit the following general report on my surveys during the past season in the railway belt, British Columbia.

A year ago to-day I began the season's work by making two small surveys along the line of the Canadian Pacific railway, one near Ashcroft, the other opposite Spatsmum. At the first place there is a little cultivable bench land which would need to be irrigated. The soil, however, is of such an absorbent nature that when irrigated it has a tendency to cause slides. For this reason I understand the railway company objects to the lands adjacent to the track in this locality being irrigated. It has already been the cause of several very expensive lawsuits in which the company so far has been successful. At Spatsmum the land surveyed is adapted only for grazing, being stony, hilly and broken. This land I understand was being taken up or applied for on account of the gypsum deposits on it. Some development work has been done but I did not make any examination of it.

My next work was the subdivision of the range lands on the hills immediately south of Kamloops. These lands are covered by grazing leases. It has been a matter of contention between the lessors and the settlers as to whether the land is fit for general farming or not. The general opinion appears to have been that the land was unsuited for farming otherwise it would have been taken up and settled on many years ago. Some fifty or sixty squatters have located here within the last two years. Time alone can tell how successful they will be. Probably a few will do well while others will abandon it. The conditions have been unfavourable. The last two summers have not only been dry but they have been preceded by winters with a very light snow-fall. Last summer the grasshoppers did considerable damage to the crops. The country is mostly open but there is sufficient fuel for many years. In the gulches and low places there are poplar groves which furnish fencing material. The surface is undulating, gently rolling and hilly. The soil is the base of the hills. The water is mostly alkaline but numerous ponds and small lakes. Water for domestic use is obtained by digging. There are also good spouts of water at various places up to four thousand feet above sea level.

Mineral claims but so far only one proved to be a

From here I went to Long Lake and surveyed the boundary of these lands.

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ary had been decided on. This survey was made chiefly to meet the requirements of settlers who had located here recently. The country here is partly open and partly timbered. The bottom land of which there is but a small quantity has considerable brush on it. The high land requires to be irrigated. There is not sufficient water for this purpose unless the lakes at the head of the creek are drained. All the suitable land for farming has already been taken up. There is a good wagon road from Kamloops by way of Hefferly creek. There is an ascent of about fifteen hundred feet.

From here I came down to north Thompson valley where I spent some considerable time making surveys to fix the location of some old provincial lots so that the areas of the adjoining quarter sections might be found. This kind of survey involves a great deal more work than would be called for in making an original survey. It is often unsatisfactory as the old lines or corners can not be found and much of the work done seems to be to no purpose.

On completing the work here I went to Revelstoke where after making a small survey west of the town I proceeded to connect the right-of-way of the Arrow lake branch of the Canadian Pacific railway with the Dominion section lines. A little delay was occasioned here through not knowing the exact way in which the survey should be made. The weather, too, which had, so far, been fine turned wet and continued so for almost the remainder of the season.

From here I went south to the valley of Incomappleux river. From the boundary of the belt I made a sectional survey about six miles up the river. I also traversed both banks of the river. The valley is about three-quarters of a mile in width and has steep mountains on each side. On the mountain side the timber is medium sized hemlock, cedar and fir. On the higher lands in the valley there is some very large cedar. On the low lands the timber is spruce and cottonwood. The greater part of the valley is fit for settlement, and the climate is not unfavourable. The cost of clearing an acre of the best land would range from one hundred to two hundred dollars. Freshets occur in the river during spring and after a heavy rainfall of several days duration when low lying lands are flooded. The most valuable natural resources of this district are the timber and minerals. The timber is very conveniently situated to the river which is navigable for logs at certain stages of the water. Very rich mineral has been found here but most of the claims are high up on the mountains, and as transportation is by means of pack horses the cost of getting the ore out is too great to permit of the mines being worked at a profit. There are numerous small streams flowing into Incomappleux river, upon each of which there is some available water-power. Goat were seen on the mountain sides and marten, mink and weasel in the valley. The usual route to this district is by way of Revelstoke, thence by the branch line to Arrowhead, thence by steamboat to Beaton or Comaplix, thence by stage to Camborne; from the latter place there is a pack trail up the valley on each side of the river.

On my return to Kamloops I made several small surveys on Shuswap lake (two on Mara lake and one at Cinnemousun narrows). All these lands had been applied for. Years ago it was thought that all the land suitable for settlement in the railway belt had been surveyed and taken up but still the settlers continue to come and squat on land where the prospects of making a good living are not at all promising. I think it is the good climate rather than the land which induces people to come to British Columbia; this is especially the case where people come from the Northwest.

I have the honour to be, sir,

Your obedient servant,

JOS E. ROSS, *D.L.S.*

APPENDIX No. 38.**REPORT OF ARTHUR SAINT CYR, D.L.S.****SURVEYS OF BLOCK OUTLINES IN THE PEACE RIVER DISTRICT.****OTTAWA, March 15, 1907.**

**E. DEVILLE, Esq., LL.D.,
Surveyor General.
Ottawa.**

SIR,—I have the honour to submit the following general report of my surveys of block outlines in the Peace river district performed under your instructions, dated March 12, 1906.

I left Ottawa on March 13, and five days later arrived in Edmonton, where I stayed just long enough to organize my party, consisting of twelve men, and to arrange their transportation to Lesser Slave lake. The bulk of my supplies and outfit, ordered a month before, had already been shipped to its destination over the winter roads.

On March 23 I started for Athabaska Landing, where we arrived on the 26th. Here sleds were substituted for the wagons, and the next day we continued our trip over Athabaska river towards Lesser Slave lake.

No serious difficulties were met with on Slave river, though we frequently found the ice covered with a foot of water. In such places the ice was unsafe and it necessitated long detours. We pushed on with all diligence, trusting much to luck, but at five miles above Donaldson's ranch, which is at the confluence of the Moose and Slave rivers, the sled carrying my instruments suddenly broke through the ice. This is a particularly bad spot on the river, and is much feared by all freighters. The river here is very deep, and owing to many warm springs the ice is always more or less cut by air holes, and thus made unsafe. The great width of the rack which was bolted to the sleds, and which caught on the edge of the ice, prevented us all from going to the bottom. It also allowed us time to save the instruments and to recover most of the baggage which was afloat. However, we resumed our trip over the ice keeping close to the shore, but a few miles farther on we found the river clear of ice, and so we had to land. Here I got two wagons to take up most of our outfit, and with light loaded sleds we reached Johnny Stony's place on the left bank of the river.

From this point we followed the winter overland trail, which runs across a couple of small lakes and some large swamps. It is the most direct route to the foot of Lesser Slave lake. In crossing the lake we were delayed by having to go around a large opening which generally forms at the lake narrows and which every year causes the loss of the loads and outfits of many freighters.

On April 2 we landed about three miles east of Stony point and reached the trading post of Revillon Bros. at Lesser Slave lake, the same night. Here I arranged with two freighters to take to Snipe lake part of the supplies required for completing the survey of the seventeenth and eighteenth base lines west of the fifth meridian. I had already forwarded baled hay and oats to that point which I intended to make my depot for this survey.

On April 9, having received from Revillon Bros., successors to Bredin & Cornwall, part of Mr. Wallace's packing outfit, which had been stored with them the previous fall, I crossed Buffalo bay and went to camp at Prairie River Settlement. In this vicinity the quality of the soil is all that could be desired for any kind of cultivation. Though recently opened, this section bids fair to become one of the most prosperous in the country. There is already a large acreage under cultivation, and the returns from the tilled land have exceeded all the expectations of the settlers. Moreover, they have no trouble in marketing their produce at high prices. Good hay in unlimited quanti-

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ties can be cut in this vicinity and along the shore of Slave lake, so that it becomes an easy matter for farmers to keep cattle. This country is well watered by numerous running streams. Oats and barley had been successfully grown here for some years, but Mr. O. D. Hill was the first to try growing wheat. The experiment proved successful, and it is expected that wheat growing will become one of the chief occupations of the farmers. Up to the present all the flour used in this district has had to be brought from Edmonton or Morinville at very great expense. This is the land which, in 1905, I recommended to you for immediate survey, and I am glad that it is turning out so well.

A good wagon road connects Prairie River Settlement with that of Lesser Slave lake and also with the trading post and mission at Sturgeon lake which is situated about sixty-five miles to the southwest. On April 11 we left the settlement by the Sturgeon lake winter road, and soon came to an undulating country wooded with poplar, birch and spruce. At noon we forded West Prairie river. During the afternoon we continued our journey through the forest, and at night pitched our tents near a small lake lying about thirteen miles southwest of the settlement. The country around that lake is low and swampy. The next day we crossed the nineteenth base line in township 72, range 17. From there the land gradually rises and the road skirts along the southern slope.

Late in the afternoon we reached the east shore of Snipe lake, 1,800 feet above sea level. Here the freighters were paid off. Some of the men were now instructed to put up the supplies in seventy-five pound packages, while the rest were sent to cut a trail around the lake and build a cache near its south end. In this cache I intended to leave what supplies were not wanted for immediate use, and thus avoid in the future the trip around the north end of this lake.

On April 17 we travelled to the west side of Snipe lake and camped at the intersection of our newly cut pack trail with the Sturgeon lake winter road which is a continuation of the one followed by us since we left the settlement. West of Snipe lake all the timber has been burnt and with very little work the land which is good could be cleared of the willow and poplar scrub with which it is now covered. This flat country extends also north of Snipe lake. There it is covered with small birch and second growth poplar and a few spruce. It is drained by Snipe creek which empties into Little Smoky river less than a mile north of the point where the nineteenth base line intersects that stream. To the south it is bounded by a range of low hills which rise opposite the southern extremity of the lake and extend in a westerly direction. From the west shore of Snipe lake where we had established our depot we continued the work on the trail leading south towards the eighteenth base line, which is twelve miles distant. On April 19 we camped at a creek of running water, one-quarter of a mile east of the northeast corner of section 31, township 68, range 19, west of the fifth meridian, which was the initial point of my survey. The country travelled over between the south extremity of Snipe lake and the eighteenth base line is rolling and the land is timbered with poplar, spruce, balsam, fir and birch from six to twelve inches in diameter. The soil is a black loam from four to six inches deep with a clay subsoil. We crossed numerous small streams all flowing northwesterly, the principal one being Carrot creek which we crossed about four miles north of the line. It flows between high banks and empties into Little Smoky river joining it a mile and a half south of the point where the winter road comes down to the river. From the top of the hill which bounds the valley of Carrot creek on the south the land is flat and is densely wooded with spruce averaging six inches in diameter.

I began the survey of the eighteenth base line at the northeast corner of township 68, range 20. In this range the soil is principally clay with an alluvial deposit of black loam a few inches in depth. The surface is undulating and is timbered throughout with poplar, cottonwood, spruce, balsam, fir and birch. There is also an undergrowth of willow and alder which is very thick in places. All the different kinds of timber are well distributed as to size, running from six to twelve inches in diameter. Many small running streams, tributaries to Carrot creek, drain this part

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of the country. In section 35 we crossed the height of land (2,300 feet above sea level) between Carrot creek and Goose river.

In range 21 the base line crosses Goose river (altitude 1,900 feet above sea level) three times, once in the middle of section 34 and twice at short intervals near the northeast corner of section 33. This stream coming from the southeast flows also into Little Smoky river, joining it about two miles north of its intersection with the base line.

Goose river is two chains wide with banks ten to forty feet high. It flows swiftly over a stony bottom. A well defined pack trail intersecting the north boundary of this township near the northeast corner of section 33 leads to the confluence of Goose river with Little Smoky river. This is a favourite camping ground used by the Indian hunters from Sturgeon lake when journeying to the south on their frequent hunting expeditions.

Little Smoky river (1,700 feet above sea level) is the next and largest stream intersected by this line. It is met first in the middle of section 31 and again close to the northeast corner of township 68, range 22. At this crossing the river is three chains wide with a depth of three feet, at the time of survey. It has a sandy bottom and its banks are thirty feet high. Its valley is about half a mile wide. There is some partly open level land, at intervals along this stream and thin seams of coal were seen along its banks. The east half of this range is wooded with poplar, spruce and birch. The soil is the same as in the preceding range. The west half is in places swampy, and wooded with small spruce.

In range 22 Little Smoky river is crossed for the last time in the middle of section 36. From that point westerly to the northeast corner of township 68, range 23, the ground is gradually rising and undulating. In sections 35 and 34 the land is covered with young poplar and scrub willow and could be easily cleared. Sections 33 and 34 are generally swampy. Then poplar and spruce bush begins and extends to the west limit of this range which is as far as this survey went. The monument marking the northeast corner of township 68, range 23, as established by this survey, was erected. A line was also opened between that post and the one established by a previous survey and its length and bearing were recorded in the notes. The pack trail from lake St. Ann to Sturgeon lake crosses this line close to the northeast corner of township 68, range 23. The general elevation of this part of the country is 2,000 feet above sea level. The soil is good.

I now returned along the eighteenth base completing, on the way, some mounding which had been left undone on account of frost in the ground, and reached again our main cache at the northeast corner of township 68, range 20. From that point a trail had to be opened southerly towards the seventeenth base line, twenty-four miles distant.

The country between these base lines is also thickly wooded with poplar, spruce, cottonwood and birch while jackpine grows on the high land. Its surface is rolling or undulating. On May 21 we moved camp from the cache on the eighteenth base line, and after travelling one and a half miles came to a divide 2,200 feet above the sea. Shortly afterwards we crossed a good sized creek of fresh water, beyond which our trail ran across low and swampy lands, with many small hay meadows, and here I decided to camp over night. These meadows were the only ones noticed that day along the road. On the next day we had better travelling across a dry and park like country, sparsely wooded with small poplar, spruce and some jackpine, all probably of second growth. Then came a two-mile belt of spruce, some of them being fifteen inches in diameter. We were now approaching Goose river, which flows in a depression 200 feet below the general elevation (2,000 above sea level) of the surrounding country. Crossing one more creek we camped about ten chains west of the forks of the river. For a few days previous there had been heavy showers daily, frequently accompanied with hail. I was therefore not much surprised when, on descending towards the valley of this river, I found the ground still covered in spots with an inch or so of hail stones. The river was also so swollen that it was not safe to ford it with loaded

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pack animals. So I went to explore along the river banks for a suitable crossing. Shortly after leaving camp I came to the junction of two streams. The one from the southeast was the widest, but judging from the swiftness of the current it was also much shallower than the other branch, whose water flows through a deep channel cut between high steep banks. This last stream appears to come from the northeast and, according to the report of some Indians, it flows from a lake lying eight or ten miles from the forks. I went along this last stream for some distance, but, finding no fording place, I returned to camp and had a raft built on which we crossed the river and continued the work on the trail, leaving the ferrying of the outfit till the water should have somewhat subsided. For a distance of half a mile from that point we followed along the left bank of the river, which, however, soon got so steep and high that we had again to enter the woods. Here we had to make a detour to the west in order to avoid some muskegs which lie in the vicinity of the river.

Beyond these muskegs we came to sandy ridges wooded with jackpine, with more narrow swamps intervening. Shortly after, however, we struck a better country, with a gradual ascent towards the south. We crossed the summit (2,250 feet above sea level) four miles south of the river. For two miles more the country is nearly level. Then comes a strip of burnt country covered with windfall. These destructive fires were, however prevented from spreading east by extensive swamps and muskegs. From these swamps two good sized creeks rise and flow towards the west, where they eventually join the Iosegun river, which is a tributary to Little Smoky river. At three miles south of the summit we came to Atikkamek ('poisson blanc') creek, another deep stream across which we had to throw a bridge about one mile east of its confluence with Iosegun river. This last part of our journey had been made over very soft ground, which would have been impassable but for the fact that the subsoil was still frozen in many places. Across Atikkamek creek we found the old Lake St. Ann pack trail, which we followed easterly and which led us to the place where Mr. Driscoll had two years before cached his survey posts.

I began the survey of the seventeenth base, which is the north boundary of township 64, at the northeast corner of section 34, in range 19, and produced it westerly for three ranges and a half across a timbered country drained by many streams, chief among which are Little Smoky river and two of its affluents—Iosegun river from the east and Waskahigan river from the west. I believe that these rivers join Little Smoky river from opposite sides within a short distance of each other. Atikkamek creek, which I have already mentioned in describing the country between the seventeenth and the eighteenth bases, is the principal tributary of the Iosegun river. It comes from the northeast and, after intersecting the seventeenth base in range 18, flows along the south side of the line till, in section 34, range 19, it passes again to the north of it, and shortly afterwards joins Iosegun river. This creek rises in the same low country as Goose and West Prairie rivers. Only one lake, three miles long and one mile wide, was seen three-quarters of a mile north of range 20, but in this section, where so many muskegs occur, there are probably many others not seen from the line.

Exploratory trips made to the south of the line showed that the land there is also low and swampy. I was informed by my packers, who followed the pack trail along Iosegun river when going to Sturgeon lake for mail and supplies, that in that direction they found travel most difficult from the same cause. This also coincides with the reports from the Indians, who frequently visit this country on their hunting excursions. Some open prairie patches were seen, but only in occasional flats along Waskahigan river. More prairie land may, however, exist along the lower reach of this stream, whose valley seems to widen as it approaches that of Little Smoky river. The soil in these flats is good, though light. This was the best land and the easiest to clear and cultivate that I had seen since leaving Prairie river settlement. Unfortunately, there is at present no road by which this place could be reached, except the usual Indian pack trail. Large game abounds in this valley, and the trappers and Indian hunters of Sturgeon lake have built here many shanties, where they spend the winter.

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The distance to Sturgeon lake would be about forty miles by the trails. The valley of Waskahigan river has been carefully explored by different railway survey parties. The location of their lines was recorded by my chainmen when we were surveying the north boundaries of the following sections:—

At 57 chs. W. of N.E. Cor. Sec. 32 Tp. 64 Rge. 20 W. of 5th Mer.; bearing N.W. Mag.									
6.78	"	"	36	"	64	"	21	"	north "
50.07	"	"	36	"	64	"	21	"	" "
72.33	"	"	33	"	64	"	21	"	" "
43.05	"	"	34	"	64	"	22	"	" "

These exploratory lines were surveyed across a high rolling country which is found not only in the vicinity of this river but continues for some distance to the west. The quality of the soil varies considerably along that part of the base lines which I surveyed. I will describe it now more fully taking each range in turn, beginning with the west half of range 19, township 64, west of the fifth meridian.

(NOTE.—Descriptions of the townships surveyed have been taken from this report and published as part of Appendix No. 46).

On July 2, having completed the survey of the seventeenth base line I started for Sturgeon lake over a pack trail located east of the one which I had followed in going to the same place in the fall of 1905. I was thus given an opportunity to learn more about the country west of the Waskahigan and Little Smoky rivers. This new pack trail which leaves Waskahigan river in section 5, township 65, range 22 passes over the high rolling lands overlooking Waskahigan river from the west and runs nearly parallel to it as far as the north boundary of township 65, range 22. Here it leaves the river which now turns more to the northeast in its course to Little Smoky river. The trail now descends to the valley of a large stream which rises in a hilly country many miles to the west. Beyond this creek are four miles of swamp. Thence the trail leads through higher lands extending north to a creek, which runs northeasterly across township 68, range 22. The trail now keeps along the right bank of the creek for three-quarters of a mile when it leaves it to connect with lake St. Ann pack trail two miles farther. Shortly after this we crossed the creek and continued our journey to the eighteenth base line where we camped on July 5, having travelled this far across a country mostly wooded with poplar, birch and some spruce.

Between the eighteenth base line and Sturgeon lake much of the land west of Little Smoky river is covered with a second growth of small poplar with willow scrub, the only spruce timber left being found in bluffs surrounded by narrow swamps or muskegs. I arrived at Sturgeon lake on July 7, and on the following Monday was travelling towards the sixth meridian, from which I had been instructed to survey westerly, forty-eight miles of the eighteenth base line. The road which I followed in going to the sixth base branches off from the main wagon road running along the south shore of Sturgeon lake just after crossing the bridge which now spans Goose river. If at some future time it becomes necessary to open a wagon road to Simonette river, this will be the direction to follow, as the pack trail is located through a fairly level and dry country thickly wooded with a second growth of poplar and birch. There are at present many openings of prairie land and land covered with small scrub along Moose river, this country having been overrun by a recent fire which burnt the impassable windfalls that covered it three years ago. The land thus cleared is available for immediate occupation and would permit of stock-raising and mixed farming on a small scale. This remark applies also to the country between Simonette river and its chief tributary from the west called Moose river.

SURVEY OF THE EIGHTEENTH BASE LINE.

The survey of the eighteenth base line was carried on under great difficulties and much risk owing to the bush fires which surrounded us and through which we had to cut a passage during the whole time that this survey lasted. The entire land surface

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along the eighteenth base had, until this year, been covered with a thick growth of large poplar, balm of Gilead, cottonwood, birch and spruce. Since the fire this has been changed to impassable windfall. It was expected that after crossing Smoky river we would be clear of the fire, but this did not prove to be the case for in that district also, forest fires were raging. These fires originated two years ago and, as only a few inches of snow fell in that district during the winter of 1905-6, the fires kept smouldering in the wooded sections of the country and when fanned by the wind started again all over the country in the spring of the next year. To the inconvenience resulting from the dense smoke which obscured the sky, must be added the continual danger of losing the camp equipage by fire. The initial point of the survey was the northeast corner of township 68, range 1, which I re-established according to instructions. At ten chains west of the sixth meridian this eighteenth base line crosses Moose river, which is here eighty links wide and was three feet deep at the time of survey. Its banks are ten to fifteen feet high. West of the river a flat, one-quarter of a mile wide, brings us to the foot of steep hills denuded of timber, which rise to a height of two hundred feet above the level of the river. Thence the surface of the country remains undulating and is dotted with many lakes, ponds and hay marshes most of which are connected at high water. Around some of these lakes quite a lot of hay could be cut. Such a lake three-quarters of a mile long by one-quarter of a mile wide occurs near the north boundary of section 29 in township 68, range 1. I noticed some surface stones through this township. This undulating country continues west to the middle of range 2, where it changes to five miles of high rolling country of sandy ridges with many small lakes surrounded by muskegs. West of these sand hills, the country is undulating with lakes and ponds here and there. Running across range 3 from east to west and extending to Smoky river I noticed a large depression probably occupied by a stream which joins the river three or four miles south of the line.

Smoky river crosses the line at the northeast corner of section 32, township 68, range 4. At this point the river is one hundred and thirty yards wide and flows between precipitous banks alternating with flats, at one time well wooded with large spruce. The valley is two miles wide. The bed of the river is three hundred and fifty feet lower than the bench lands on the west side and its channel, which is very tortuous, is frequently filled with large boulders causing dangerous rapids. Along its banks are accumulations of drift wood which extend far into the river and have cost the lives of many prospectors who were bold enough to trust themselves to its waters on a raft. The average velocity of the current cannot be less than eight miles an hour.

When I arrived at Smoky river with my survey I found the water so high and the current so swift that it could not be forded. We then built two large rafts which were to be propelled by means of poles. To make the crossing of the river doubly sure I also fitted oars to the rafts. This proved to be our salvation. Though of large size the raft on which I started was overloaded to such an extent that as soon as sent adrift it was fully covered with eight inches of water. In that condition it drifted diagonally across the river. Soon the water got so deep in the river that the poles became useless. It was then that the oars proved useful and assured our landing. The horses had to swim across but did so only after several fruitless attempts, in one of which it looked as if we would lose three of them. These horses at the start had left the rest and had struck out by themselves down stream. They were swept along by the force of the current in the main channel. At that point the main channel is very much narrowed by piles of boulders and the current runs through it like a mill-race. Here they were lost sight of in the seething waters, appearing for a few seconds above the top of the waves only to disappear again. At the lower end of that stretch of swift water the river takes a short turn to the left. Here are great piles of drift wood and the danger was that if any of them ever got caught under the drift piles they would be drowned. They were, however, carried past that obstacle, for shortly afterwards I saw one of them which had been carried into an eddy trying to climb over a large boulder whose surface had been worn smooth by the action of the cur-

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rent. However, he would only fall back into the river, after each fruitless attempt. He managed at last to reach the shore, but he was so exhausted that he remained there motionless just keeping part of his body above the water. It was in that position that men sent to bring him back found him. The others which we thought had been drowned, were found safe farther down, grazing along the banks of the river and they were brought back to camp. The place chosen for the crossing, was below an island which occupied most of the bed of the river. This island greatly diminished the current of the stream, forming here a large eddy close to the left bank of the river and making a good landing place. As there was no feed on the west side of the river the horses had to be driven upon the bench, but as fires were raging there, two men had to be left to guard them.

As with all streams which rise in the ice fields of the Rocky mountains, the highest stage of water on Smoky river occurs in the middle of the summer. At that time the larger percentage of clay which its waters hold in suspension gives them a peculiar grayish colour. It was noticed during our stay near the river in the first weeks of August that the water would fall during the night and rise again by the same amount the following day. From this I concluded that it took twenty-four hours for the freshet caused by the increased melting of the snow to travel from the headwaters to the latitude of the base line. Thus the average velocity of the current would be four miles an hour, though it is probable that in the high reaches of the river it is considerably more than that. When we crossed this stream a month later the water was not lowered to any appreciable extent. The left bank of Smoky river, where the line intersects, is precipitous and ends in a bench of very poor soil half a mile wide. The next stream crossed by the line was Big Mountain creek. At the time of the survey this creek was simply a succession of large and deep pools connected by small rivulets, but there were indications along the bank that in the flood the water reaches a high level, and the stream must be a regular torrent. Six miles south of the base line I noticed a range of hills 2,650 feet above sea level, where the creek probably has its source. One mile north of the line this stream receives from the west a tributary ten or twelve miles long. Its valley runs nearly parallel to the base line and contains a muskeg which effectually prevented the fire from spreading eastward.

Range 6 contains much high rolling land. The greater part is covered with scrub willow, and is thinly wooded with a second growth of poplar and birch. There is also some partly open country. The west half of this range is stony in places. All the brooks, large and small, crossed by the line, were dry, and the water for the use of the camp had to be drawn from wells dug in the muskegs which had not been over-run by fire. Later on, however, a flowing spring, which was discovered near the centre of section 31, supplied us with the only running water we had had since leaving Big Mountain creek. This spring feeds a creek which flows to the southeast, where it is reported to join Big Mountain creek. Another creek which crosses the line in section 32 runs northward and empties into the west branch of Big Mountain creek.

In range 7 the surface varies from rolling in the east half to undulating in the west half of the township. Here also the recent fires have cleared the land of much of the dead timber with which it was covered. From the northeast corner of section 32 the surface slopes down to the valley which cuts that section diagonally and where there are still bluffs of green timber. These bluffs, being surrounded by swamp, have so far escaped the ravages of the fire. In the southwest of this township some high ridges were noticed. Running streams are scarce, only two small creeks, five miles apart, crossing the north boundary of the township. There is a small hay meadow near the northeast corner of township 68, range 8. The surface of the country in range 8 is frequently broken by narrow sandy ridges running in general east and west, with many muskegs between. The soil is pretty uniform in quality, being a clay covered with about six inches of light soil. Stones were seen at different places in this township.

Three pack trails intersect the eighteenth base line between ranges 1 and 8, in-

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clusive, west of the sixth meridian. The first one was noticed on the bench forming the left bank of Smoky river. It passes at thirty chains west of the northeast corner of section 32, township 68, range 4. This pack trail will be impassable now on account of the heavy windfalls which cover the country. The next one is well defined, and intersects the base line one-half mile east of Big Mountain creek. This trail leads to Wapiti river, ten miles to the north of the base line. After crossing this river it joins the trails to Saskatoon, Bear Lake and Grande Prairie Settlement. A third trail, also well travelled, crosses the line in the middle of section 31, township 68, range 6. It leads towards the north across four or five miles of pretty open country; thence through a forest which continues as far as Wapiti river. On the north side of this river it leads to the trading post at Saskatoon lake. From Lesser Slave lake I travelled seventy-five miles to Peace River Landing. Here I crossed with my outfit on the ferry and proceeded by wagon road to Brick's Settlement, thirteen miles to the southwest of the landing. I met Mr. Brick, the local member, and from him obtained much valuable information regarding the country which I was to survey.

On October 2, having received all my supplies, I left the settlement by the Dunvegan road, which I followed to its intersection with the old Hudson bay cart trail. From there I continued my journey in a northwesterly direction and camped at the south shore of Bear lake, within three miles of its west end. The next day I reached Last lake at the northeast corner of township 83, range 1, west of the sixth meridian. Between the settlement and Last lake are many poplar groves and willows, with patches of prairie, but there is very little timber of any use except for firewood. The soil is good throughout. North of Last lake we entered an undulating country, with some windfall and the remains of old brulé, which is at present overgrown with young poplar, birch and willow scrub.

On October 8, we struck the twenty-second base line, surveyed many years ago, and consequently hardly visible, and camped near a creek a quarter of a mile east of the northeast corner of township 84, the initial point of my survey.

SURVEY OF PART OF THE TWENTY-SECOND BASE LINE FROM RANGE 21 TO THE SIXTH MERIDIAN.

The twenty-second base line runs at a short distance south of the summit of Whitemud hills which divide the valleys of Peace and Whitemud rivers. These hills rise above the surrounding country from three hundred to five hundred feet and cross the sixth meridian in township 85. From the sixth meridian they extend east as far as range 25 west of the fifth meridian. In that distance, thirteen and one-half miles of rolling country, the land is strewn with much dead timber. It is also stony in places in the east half of range 25. No prairie exists at present along this base line, but were any fire to get started, a pretty clean sweep would be made of all that dead timber, and this would render that part of the country valuable for grazing purposes. In many other sections where this has occurred, the land has grown in great profusion nutritious grasses such as peavine, etc. Numerous brooks take their rise in the ponds and marshes at the summit and flow down from these hills in all directions. Those which flow north, run into Whitemud river, while streams flowing south, empty into Bear lake which is about eight miles long by three miles wide. The land at both extremities of this lake and for some distance along its south shore is said to be boggy, and this saved from the fires a very small area northeast of Bear lake. Here to-day can be found a strip of green spruce three miles wide. Since 1896 fires have overrun the country along Peace river and therefore this part is full of windfall. The same remark applies to the range and a half adjoining the sixth meridian. The rest of the country, especially the summit of Whitemud hills, is made impassable by the large number of dead trees on the ground. The soil in the fractional range 26 and in the whole of range 25 is black loam from two to five inches in depth with a clay subsoil. All the streams are small and flow south towards a creek which enters Bear lake near the west end. This creek crosses the line near the northeast corner of section 31, range 25, and flows through a high rolling country while along one bank runs a well defined pack trail which leads to the west end of Bear lake. Small brooks

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flowing south cross the boundary nearly every mile. From range 25 the ground slopes eastward throughout range 24 and there the rolling country ends, the country from that point to the outlet of Bear lake in section 32, range 23 being level. There are here some hay meadows and tamarack swamps that drain into the outlet of Bear lake. This outlet, a sluggish stream forty links wide with a soft muddy bottom, flows north into Whitemud river, crossing the line near the northeast corner of section 32. The divide between its valley and that of Peace river is crossed at the northeast corner of section 33. The approaches to this stream are boggy and it was found necessary to make a corduroy road and to throw a bridge over the creek before it could be crossed by the pack animals. East of the stream the surface of the country changes from undulating to rolling. Three miles beyond the divide is another stream which rises from three lakes lying four miles north of the base line. Hay lands, in irregular patches, are found around these lakes and along this creek. A rancher, Mr. St. Germain, has cut twenty miles of roads from his farm on Peace river to these lakes, which is the nearest place where sufficient hay can be procured to feed his cattle. It is now his intention to cut this road northward to Whitemud river, which he claims is not very distant and where extensive prairies are reported to exist. Through range 22, there are many hay meadows, the largest being in the east half of section 33. From the northeast corner of section 35 the ground begins to slope down gradually to the west edge of Peace river valley. From that point precipitous cutbanks lead to the river banks, a drop of seven hundred feet in half a mile. On the fourth, the survey having been carried as far as the river, we returned to the landing, effecting the crossing of the river, just before this became impossible on account of floating ice. From the Hudson's Bay company's trading post at Peace River Landing, we cut a trail along the river to the twenty-second base line, and camped near an island close to its right bank. The distance across Peace river on the line is eight hundred and fifty yards, from shore to shore and six hundred and thirty yards between its left bank and the near shore of an island, separated by a narrow channel from the right bank. The summit of the bench which faces the river from the east, occurs at one and three-quarter miles from the river and is seven hundred feet above the river. This bench is thirty chains wide; then a gulch six hundred and seventy-five feet deep and three-quarters of a mile wide occurs. Then a second bench also thirty chains wide is followed by a very wide and deep ravine. On the west slope of this ravine was erected the monument which marks the northeast corner of township 84, range 21, west of the fifth meridian. This ended my survey of the twenty-second base line.

Description of the country along part of the twenty-first base line through ranges 21, 22, 23 and 24, all west of the fifth meridian.

(NOTE.—Descriptions of townships surveyed have been taken from this report and published as part of Appendix No. 46.)

Description of the country along the twenty-second base line between range 21, west of the fifth meridian, and the sixth meridian.

(NOTE.—Descriptions of townships surveyed have been taken from this report and published as part of Appendix No. 46.)

When I returned to Peace River Landing after completing the survey of the twenty-second base line, I was informed that there was a pack trail from the Hudson's Bay company's post. It runs north for twenty-five miles, which would bring it to Cadotte river. This trail might prove to be the right one to use in going to the twenty-second base line if, at any future time, it was decided to have it surveyed farther east. By following it, all the deep gulches in the vicinity of Peace river could thus be avoided.

West of Peace river the following well defined pack trails, which intersect the twenty-second base line were noted:—

A pack trail, running north and south, intersects the north boundary of section 32 in township 84, range 25. It is located on the left bank of a good sized stream flowing into Bear lake. Four miles south of the base line it leaves the valley of the

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creek, and turning a little to the east, passes close to two small lakes, before it comes to the west extremity of Bear lake. Another well travelled trail is the one which crosses the north boundary of section 36, range 24. From its intersection with the line, it leads northerly to Whitemud river, and southerly to the Roman Catholic mission on Peace river. It passes close to the north end of Bear lake. There is also our wagon road which runs north from Last lake to join the wagon road opened by Mr. Selby along the base line, west of the sixth meridian. It was found necessary to continue this road easterly to range 23. The settlers at Peace River Landing and at Brick's settlement are at a great disadvantage as far as their supply of hay is concerned. Those living along the road leading from the Landing to Brick's Settlement have to go over twenty miles, but even at that distance they cannot procure all they require. They are going to continue the hay roads several miles north of the base in order to reach some meadows surrounding a group of lakes, around which they expect to procure more hay. At Brick's Settlement, they have to go as far as Last lake, a distance of twenty-five miles. Around Bear lake some hay could also be put up, but the supply is not assured as it depends much on the depth of water in the lake. Those living on the right bank of Peace river have to travel southeast to Little Prairie, twenty-two miles distant. This district supplies most of what is required at the Landing. The northern limit of the forested country which extends northward from the Landing, runs parallel to the north boundary of range 21 and within a short distance of it. East of range 21, the most easterly range surveyed by me, the country is level. There most of the country seems to have been over-run by fire five years ago and what appeared to be partly open country was noticed north of the future location of the twenty-second base line. I am informed that a well travelled pack trail, which begins at the Landing, runs through that section for twenty-five miles, which would bring it to Cadotte river. Whenever it is decided to continue the survey of that base line, this trail will be the proper one to follow as it goes far enough east of Peace river to avoid all the wide deep gulches which lead down to it.

On November 15, we returned to the Hudson's Bay company's trading post at the Landing, whence I proceeded to Little Prairie, a distance of twenty-four miles, in a southeasterly direction. We stopped at the place of Archy Campeau, a half-breed squatter, who agreed to supply baled hay and grain, and to deliver it on the line wherever it would be most needed. There was, at that time, enough snow to make good sleighing, so I rented two sets of sleds. I also kept five horses, out of the sixteen I had, and provided a tent for them. The others were driven back to Prairie Settlement for the winter. From Archy Campeau's it was found necessary to open a sled road westward to Smoky river. On the 20th we moved seven miles in a southwesterly direction and camped at a small prairie, close to a good-sized creek. For the first three miles from Campeau's the trail runs across prairie lands, with scattered clumps of willow and a few poplar bluffs. This sort of country extends to the valley of North Heart river, a stream one chain wide and three or four feet deep. The water runs swiftly over a gravelled bottom. On each side of the river, at some distance from the bank, there is a bench of land fifty feet high. Across the river the land is thinly timbered with poplar and birch and many small prairie openings surrounded by willow scrub. The men were daily kept at work on the road. On December 15 we reached the valley of Smoky river, having come through a nearly level country fairly well wooded. The forest is partly free of underbrush, and as there is no windfall, we made good progress with the road, considering the short days. The land is a good clay with a few inches of alluvial soil on top. Range 21 and the east half of range 22 are well watered by numerous running streams, while in the west half of range 22 are extensive hay meadows occupying shallow depressions parallel with the general course of the river, distant three miles west. On December 15 we reached the valley of Smoky river, but its banks are so high and so precipitous, that I saw at once the impossibility of travelling any farther west with the sleds. Explorations were begun along the banks of the river, and a gulch leading to the river was discovered. This

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gulch follows the north boundary of section 3, township 80, range 23 and, though its bottom was found piled high with dead trees, and though its sides were very steep in places, I managed to clear a pack trail down this ravine to Smoky river. West of the river another gulch was found, one mile south of that one followed on the opposite side. Up this first gulch the ascent is more gradual, and it was a comparatively easy matter to get to the top of the bench, seven hundred feet above the river. From the valley of Smoky river to the east boundary of township 80, range 25, the distance is eight miles through wooded country. On December 25 the pack trail had been opened to within three-quarters of a mile of the initial point of my survey.

The survey of the north boundary of township 80, range 24, was made according to your instructions, and by January 9, the work had been carried east as far as Smoky river, which flows from south to north across the middle of this township. The whole country west of Smoky river is undulating, covered with much underbrush and wooded with timber averaging twelve inches in diameter. The soil is five or six inches of black loam with a subsoil of clay. Owing to the proximity of the valleys of Peace and Smoky rivers no large creeks were crossed by the line; still sufficient water could be found in the numerous willow swamps which dot this part of the country. A large muskeg extends north of section 33, and small streams flowing north cross the north boundary of section 32. On the line Smoky river is three hundred and thirty yards wide. It is a swift flowing stream, whose channel is frequently obstructed by large quantities of boulders. Its valley from side to side is one mile and one-quarter wide, and is inclosed between high mud banks with only a narrow margin of flat land next the banks of the river.

Range 21 being in the basin of North Heart river, is well watered by several tributaries of that stream. At a quarter of a mile south of the north boundary of section 31, there is a large hay meadow. All through this range there are many willow swamps from which rise nearly all the creeks flowing southeasterly into North Heart river. The west branch of the pack trail from Little Prairie, crosses the line in section 34. This country along Smoky river is now made accessible, from Little Prairie, by means of the road which I had to open westward, between the Peace river wagon road and Smoky river. All the prairie land found at Little Prairie would be included in the north half of township 80, range 18, the west half of township 81, range 18, and in the east half of township 81, range 19, all west of the fifth meridian. There are at present living at Little Prairie, a few halfbreeds, trappers and freighters who have located along the Peace river road. They keep cattle and horses and put up hay in very large quantities, with which they supply the freighters and the settlers at the Landing. They have not yet attempted any kind of cultivation though the land is fertile and well watered by North Heart river and its many tributaries.

On January 31, I left Little Prairie for Lesser Slave lake, where I arrived on February 2. Here I stored part of my outfit with Mr. M. Revillon, and the five horses which we had kept on the winter work, and some outfit and supplies were turned over to Mr. O. D. Hill, of Prairie River Settlement, to be cared for till such time as they would be required again by the government surveyors. I then made arrangements with Mr. Hawkins to bring my party down as far as Athabaska Landing. From that place I went to Edmonton with some returning freighters. Here I received your instructions as to the shipment over the winter roads towards the mountains, of supplies which would be required by surveyors to be employed during the next summer. I found it necessary to give my personal attention to every detail, and left only after I had seen each surveyor's supplies and survey posts separately loaded and made ready for their destination.

My surveys of last season were distributed over a large area, which necessitated long trips between each work and considerable road cutting in places. Besides, the forest fires, which were overrunning the country along the eighteenth base line west of the sixth meridian, were so fierce, at times, on this line, that it was very doubtful

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many times, where we would pass through, and I must say that it was only by taking every chance that this was successfully done.

Large game is found everywhere in these woods. Large colonies of beavers were seen on almost every stream, where coyotes and other fur-bearing animals are numerous. In the streams, pike, pickerel and trout were caught. As to minerals, coal is the principal one found so far, and there seems to be no scarcity of it. According to people who have lived there for some years, the climate of that part of the country is better than that of the country to the south.

I have the honour to be, sir,
Your obedient servant,

ARTHUR SAINT CYR, *D.L.S.*

APPENDIX No. 39.

REPORT OF J. B. SAINT CYR, *D.L.S.*

SURVEYS AND RESURVEYS IN MANITOBA.

STE. ANNE DE LA PÉRADE, QUE., December 13, 1906.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to report as follows on the survey and resurvey made in Manitoba in October and November, 1906.

On my arrival in Edmonton from the Peace River district, October 12, I received your telegram telling me to go to Pipestone, Manitoba, where instructions were awaiting me. I left Strathcona on October 23, having been delayed in Edmonton waiting for my baggage from Athabaska Landing, and arrived at Pipestone the 25th of the same month.

Having made the necessary arrangements, the following day I began the survey of that portion of township 6, range-26, west of the principal meridian, which had not been previously made, the country being flooded at the time of the original survey. I also made the resurvey of some of the old lines, as a few corners could not be found by the owners of the land. This survey was completed on November 10.

(NOTE.—Descriptions of the townships surveyed have been taken from this report and published as part of Appendix No. 46.)

On November 6, I commenced the survey of all the section lines in township 6, range 25, around Marshy lake and adjoining the south part of a great marsh, generally called Maple lake by the people of that place. I also made the resurvey of the lines of sections 5, 6 and 7, in the same township. The whole was completed on November 23.

On November 12, I went to township 6, range 27, to settle a difficulty between settlers about corners of sections 19, 20, 30 and 29. Having brought these people to a certain agreement, I surveyed the north boundary of sections 19 and 20 as indicated on the original plan, fixing and marking the different corners with cedar posts and making the proper mounding.

Reston is the nearest railroad station from this township; it is situated about three miles north of section 19. There are grain elevators also in this important place. I noticed here, as well as in the adjoining townships, that very large fields had

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been ploughed by the settlers. The farmers seem to be well off, and have great faith in the future of this wheat-growing country.

November 23 I left Pipestone, Manitoba, on my way home.

I have the honour to be, sir,

Your obedient servant,

J. B. SAINT CYR, *D.L.S.*

APPENDIX No. 40.

REPORT OF J. B. SAINT CYR, *D.L.S.*

SURVEY OF SETTLEMENTS IN PEACE RIVER DISTRICT.

STE. ANNE DE LA PÉRADE, QUE., December 5, 1906.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report of my field operations during the past season in the Peace River district, together with some information regarding the country in the neighbourhood of Fort Vermilion.

In accordance with your instructions, dated May 2, 1906, I left Ste. Anne de la Pérade on the 12th of the same month for the Northwest.

On May 18, I left Edmonton, and on June 14, I arrived at Fort Vermilion, Peace river valley. I spent several days forming a party in order to do the survey of Fort Vermilion Settlement (south of Peace river). This was a rather difficult task, especially in that country where people have a great deal of work to do on their farms. Grain culture has paid well at Fort Vermilion in recent years, the Hudson's Bay company paying as much as one dollar and fifty cents a bushel for wheat. Otherwise the farmers who may have some spare days are engaged with the company to work at the mills, on their farm, at some buildings in construction and on the steamer.

On June 19, I began the survey of Fort Vermilion Settlement, which I closed on July 28, all my men having gone for the hay harvest. This settlement extends over six ranges containing in all fifty-five lots of various dimensions. Every range line runs east and west and the division lines of the lots north and south.

A tract of land of about three miles and a half from east to west by three miles and a quarter from south to north forms that portion of the settlement surveyed. The Hudson's Bay company has its reserve adjoining Peace river and nearly in the middle of the settlement. The subdivision has been made in such a way as to give to every settler his improvements.

The general aspect of the country is prairie and bluffs and the soil is a black sandy loam overlying a clay and sandy subsoil. The bluffs are timbered with spruce and poplar three to fifteen inches in diameter, with clumps of large tangled willow. The bank of the river stands about eighteen feet above low water mark. The land is level in the central portion of the settlement to a third of a mile inland where the ground rises about fifteen or eighteen feet. From the summit of that elevation an immense plateau extends towards the east, the south and the southwest.

No minerals of economic value were found during the progress of the survey, and there is no water-power. Hay is rather scarce here; settlers have to go as far as ten or fifteen miles and sometimes more to procure the quantity required to feed their cattle during the winter. Wood for fuel is very plentiful.

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I will give further on, details of the climate, the general resources and features of that portion of Alberta. The Hudson's Bay company own a very extensive establishment at Fort Vermilion, including a sawmill and a modern flour mill. The two missions have also a number of buildings and cultivate large fields. The most of the settlers around Fort Vermilion last summer had from forty to a hundred acres under crop. Besides the missions and the Hudson's Bay company there are twenty farmers south of the river on an area of about ten miles by three miles. Mr. Sheridan Lawrence is one of the biggest farmers there and has an extensive farm at Prairie Point, fifteen miles above Fort Vermilion on the north side of Peace river. Mr. Lawrence's crop last fall was nearly five thousand bushels of wheat and two thousand bushels of oats and barley. Very good buildings have been erected there by him. Every one of these farmers has a large number of cattle and horses and have all the implements necessary on a farm.

Among the petitioners to the government some are no longer residents of Fort Vermilion, viz.: Erastus John Lawrence, Clara Lawrence, Henry H. Lawrence, Prudent d'Amour, Minnie E. Lawrence, Paul Meechatsio, Henry P. Panter (residing at Peace River Landing), Clement Paul (at Keg river), Xavier Sawan (at Wolverine point) and John Flett. They have sold out their buildings and improvements on the farms formerly occupied by them.

Peace river is very beautiful and wide, with a current of about five miles an hour at high water and two to three miles an hour during the low water period. The channel varies a good deal in depth in different places on account of the sand and gravel bars which nearly cross the river. In front of the Hudson's Bay company's reserve, I found that the deepest parts of the channel measured thirty-four feet at low water, in the month of October. When the snow is melting in the mountains in the months of June and July, the river rises sometimes ten to fifteen feet above low water mark. A great number of well timbered islands are seen all along the river.

On June 20, I began the subdivision of North Vermilion Settlement (north of Peace river), which I completed on September 5. The country there is more timbered than in the other settlement. All the fields now under cultivation have been cleared. The soil is of a better quality, being a deep black loam resting on a clay or sandy clay subsoil. This settlement consists of only one range with fifteen lots in it. I have been obliged to give to the division lines, to correspond with the improvements of the settlers, a bearing of $334^{\circ} 00'$ instead of north and south. The timber consists of poplar and spruce varying from six to fifteen inches in diameter with patches of thick large willow. The country is undulating on that side of Peace river. Hay is plentiful along Gull lake, Gull creek and Shoal lake north of this settlement. Gull creek is the only stream in this settlement. It was dry last summer and can be used as a water-power only in the spring or in rainy summers. The Roman Catholic mission has built a dam and erected a mill on that creek in lot No. 4. There are two fur trading posts here, one store owned by the Hudson's Bay company and the other by Revillon Bros. Both companies are doing well, for the fur-bearing animals abound in all the surrounding region. There are only seven farmers in this settlement. No mineral of any description has been found. Before the commencement of this second survey I made a traverse of Peace river and of the islands, connecting the two settlements to get the distance across the river and to establish the respective positions of these.

On September 12 I started the subdivision at Boyer Settlement and on the 24th of the same month I was forced to close the survey because the few men I had, were leaving the work to do their ploughing. As it was useless for me to think of forming another party to complete this survey and that of Fort Vermilion, I left the place on September 25 on my way to Athabaska Landing. I arrived in Edmonton on October 12, where I received your telegram telling me to go to Pipestone to make certain surveys in Manitoba.

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In Boyer Settlement the soil is of first quality almost entirely. It is composed of a deep black loam and black sandy loam overlying a clay and sandy clay subsoil. This country is undulating and the surface is prairie and bluffs principally timbered with poplar and spruce mixed with large willow. This timber measures from six to fourteen inches in diameter. This settlement is bounded on the north by Boyer river flowing into Peace river. The first mentioned stream has a depth of two to fifteen feet and a width of about a chain and a half to two chains, and a current of a mile and a half an hour. A few miles west of the settlement the river is divided into two branches, one coming from the northwest and the other taking its water twenty or twenty-five miles west of Wolverine point, in the neighbourhood of Keg river. The hills adjoining the river are from sixty to seventy feet high and their slopes are thickly timbered with poplar, cottonwood, spruce and large willow.

Boyer settlement contains thirty-one lots and is connected with the other near Peace river by the prolongation of the division line between lots No. 5 and No. 6.

The people travel from one village to the other by two wagon roads, one of which starts from the southwest corner of lot 5 and the other one passes between lots 22 and 23, meeting one another near the fur trading posts situated on the north side of Peace river. Hay is abundant around Gull lake and Shoal lake and also along Gull creek. Shoal lake was nearly dry last summer. No mineral of any description has been found here during the survey.

Particulars about the country through which I travelled last summer and means of communication.

In the country surrounding Lesser Slave lake and along the river of the same name the soil is very good. The surface is mostly bluffs and prairie in the neighbourhood of Swan river, Driftpile river, and also in the upper part of Lesser Slave river. There is more bush than prairie in those places and along the trail leading to Peace River Landing and also along Athabaska river, but the soil is of first quality.

Peace river flows between hills seven hundred to eight hundred feet high, for a long distance above and below Peace River Landing. Nevertheless there are small flats of alluvial deposits here and there close to the river banks. The country is nearly level on top of the above mentioned hills bordering Peace river. The low valley of the river begins to widen near Wolverine point, about two hundred miles below Peace River Landing, and at Fort Vermilion it extends from forty to fifty miles into the interior on both sides of the river.

From Keg river, west of Wolverine point and following the bank south of Boyer river the prairie runs as far as Boyer Settlement, and northwest of this last place to a distance of about fifty miles. With the exception of a belt of bush ten miles wide, the country is mostly prairie and the soil very good. There are a few muskegs here and there, but the land fit for cultivation is very extensive. A prairie thirty miles long lies also north of Buffalo Head mountain with some very good hay ground. There is nearly twenty miles of forest between this open country and Fort Vermilion. Scattered patches of prairie three to five miles in diameter are met with north of Peace river from Vermilion falls to Caribou creek. Large openings in prairie can also be seen along the road from Mustus lake to Fort Vermilion in an approximate distance of twenty-five miles.

The lower Peace river valley is reached with more facility than it used to be a few years ago owing to the newly opened trail from Athabaska Landing to the mouth of Lesser Slave river, and from this last point there is another wagon road passing on the north side of the above-mentioned river, which connects with the trail south of Lesser Slave lake. From the upper end of this lake the Peace River Landing wagon road strikes one of the navigable points on Peace river.

The Hudson's Bay company are the owners of a large steamer *The Peace River*, making three full trips every summer from Fort Vermilion and the Falls to Peace River Landing, Dunvegan and St. John and sometimes to Hudson Hope, forming about eight hundred miles of good navigation. Some of the residents of Vermilion often

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build rafts at Peace River Landing to take down the river horses, agricultural implements provisions and furniture. In the spring time they generally reach Fort Vermilion in four days as the current is very strong. The first trip of the steamer up the river is made in the latter part of May and her last trip down stream is in September, though the season of navigation could be counted from the middle of May to the last days of October. I obtained from Mr. F. A. Wilson, manager of the Hudson's Bay company's post of Fort Vermilion, a record showing at what time the river freezes in the fall and at what date it is clear of ice in the spring at Fort Vermilion.

GENERAL RESOURCES OF THE COUNTRY.

As stated above large tracts of the best land, some in bush and some in prairie, can be located all through the country, which are very well adapted for farming and ranching. On account of the small elevation above the sea, of the lower Peace river valley, the climate is comparatively good, very warm in the summer and not very cold in winter.

The farmers and immigrants will find there, a very fertile soil, growing admirably wheat, oats and barley, also all kinds of vegetables, and they will be in a position to compete with farmers of the other northern provinces in the Dominion. The wheat grown there is of first quality and ripens rapidly during the long summer days. I have seen extra good, large vegetables in every garden and field of the settlements around Vermilion. I measured some heads of cabbage four feet in circumference. The turnips, potatoes, carrots, &c., grow also to a very large size.

The timber found in the Peace river valley is poplar, cottonwood, spruce and willow, with a few white birch here and there. Spruce suitable for commercial timber is seen more or less in the vicinity of the river. There is a continuous succession of islands in this large river, thickly timbered with spruce of good quality.

The Hudson's Bay company has erected a modern flour mill and a sawmill. Both are operated by steam power and situated on the company's reserve at Fort Vermilion. The flour mill has a capacity of forty to fifty barrels a day, while the sawmill can turn into lumber in a day, one hundred logs. The Roman Catholic mission have also on Gull creek, north of Peace river, a flour mill of a capacity of ten or fifteen barrels a day, and the sawmill will probably saw twenty or thirty logs a day.

Great deposits of limestone are found at Vermilion falls and near Red river forty miles farther down the river. A large quantity of very good lime is manufactured every year by the people of the country. Ordinary salt exists in large quantity near Salt river, a tributary of Peace river and situated about one hundred and thirty miles below Vermilion falls.

There is a seam of soft coal sixty or seventy feet above the level of the river at the place called 'The Cliff,' fifteen miles north of Peace River Landing. The seam appears to be from three to five feet thick, and the coal is reported to be of good quality.

The principal mountains in view of Vermilion are the Buffalo Head mountain south of the river, and Caribou mountain lying north and northeast at a great distance from the river. I have been told by some hunters that very large lakes well stocked with trout and whitefish are found on these mountains. Bears, moose, lynx, marten, mink and foxes are very plentiful. Thousands, I should say, of wild geese and ducks of different species are seen all through that country.

CLIMATE.

All last summer the temperature was very fine, although somewhat warm. We did not have many rainy days. The vegetation is very luxuriant and rapid in the Peace river valley. When I left Edmonton on the 23rd of May last, the grass was only beginning to shoot out of the ground, and on my arrival at Peace River Landing the 8th June, on the river flat the new grass was over a foot long and the rose bushes were all in bloom. Similarly this fall when I left Peace River Landing

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the 2nd October the leaves of the trees were but little injured by the frost, and at Athabaska Landing the 10th of the same month the trees were completely stripped. Any old timers in the Peace river valley say that the winter is not so severe there as it is in many other localities farther south. The stiff cold may last two or three days at a time, after which the weather becomes milder for a week or two. The fall of snow during the winter may be compared to that of the province of Quebec in the St. Lawrence valley, being from two to four feet.

I am indebted to Mr. Alfred S. White, missionary of Fort Vermilion, for a record of the extremes of temperature from September, 1905, to August, 1906, which I have annexed to this report. I have had also some information from Father O. H. Jousard and Father Habey, also missionaries at Fort Vermilion, regarding the country. As these gentlemen have travelled this district in all directions in the summer as well as in the winter, for years, they are very well informed about the different resources of the country. I have myself explored in a radius of fifteen to twenty miles around Vermilion and found the country exactly as represented to me.

I do not doubt that before long this lower Peace river valley will prove furthermore to be exceedingly good in all respects.

I have the honour to be, sir,
Your obedient servant,

J. B. SAINT CYR,D.L.S.

RECORD of the breaking up of the ice in the spring, and also of the first crossing on the ice of Peace river at Fort Vermilion, from the year 1890 to 1906.

Year.	Ice Move.	First Crossing of the River in Boat.	Ice Drift.	First Crossing on the Ice.	Remarks.
1890 ..	May 4....	May 8.....	November 16...	November 30...	Current on Peace River is nearly five miles an hour at high water and one and one-half to two miles an hour at low water.
1891....	April 23....	" 1.....	October 29....	" 12....	
1892...	May 11 ...	" 15.....	November 4...	" 8...	
1893....	" 3....	" 10.....	October 31....	" 4....	
1894....	April 29 ...	" 6.....	November 1...	" 10. .	
1895....	" 25....	April 29.....	" 7 ..	" 15....	
1896...	May 2....	May 5.....	" 7....	" 10....	
1897....	April 20....	April 26.....	" 10....	" 13....	
1898....	" 25....	" 27.....	October 27....	" 1....	
1899....	May 5....	May 10.....	" 20....	" 12....	
1900....	April 14....	April 20.....	November 4...	" 15....	
1901....	" 26....	May 3.....	" 2....	" 6....	
1902....	May 1....	" 6.....	" 4....	.....
1903....	" 3....	" 13.....	" 11 ..	November 19...	
1904....	April 17..	April 24.....	" 16....	" 30. .	
1905....	" 27....	" 30.....	October 23....	" 1 ..	
1906...	" 20 ...	" 22.....	.....	.....

RECORD of Extremes of Temperature, Fort Vermilion, Peace River, from September, 1905, to August, 1906.

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1905.

1906.

Day	September.		October.		November.		December.		January.		February.		March.		April.		May.		June.		July.		August.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	70.0	38.4	44.5	22.7	37.0	8.4	3.0	-14.0	12.0	-4.0	8.0	-0.4	14.5	-2.0	44.8	14.5	59.0	33.0	69.0	42.7	87.8	52.3	67.0	34.5
2	77.0	47.5	48.5	27.0	26.5	10.6	16.0	3.1	5.8	-5.6	12.0	-21.2	29.0	5.8	44.0	21.9	48.0	33.0	76.8	37.5	93.7	54.0	76.0	39.5
3	74.3	48.0	41.2	32.0	30.5	12.2	19.0	2.0	32.0	-3.5	3.5	-16.2	32.5	14.8	53.0	22.0	44.9	29.7	73.4	46.4	93.7	61.2	76.0	50.0
4	76.2	42.8	41.8	29.0	27.5	12.8	21.0	5.4	31.5	-12.0	4.7	-29.2	32.8	-6.0	34.0	22.0	45.5	25.0	74.6	52.4	88.2	59.7	77.0	49.5
5	69.3	46.5	44.4	28.0	29.0	15.0	24.0	-7.0	-6.0	-27.0	5.0	-18.6	40.2	-1.5	47.7	22.1	54.0	29.0	73.0	42.5	83.5	49.0	82.5	49.0
6	57.2	47.5	44.3	32.0	33.6	17.0	16.0	-7.0	-12.5	-23.0	12.9	4.7	47.0	18.0	52.3	19.6	52.5	25.0	78.0	42.5	87.5	45.0	76.5	50.5
7	59.4	34.7	42.8	31.6	42.0	21.8	3.0	-20.0	-9.0	-19.5	16.0	-11.0	42.0	21.0	58.0	21.0	47.8	23.5	70.0	54.0	88.5	58.5	70.8	50.5
8	59.9	30.5	44.2	33.0	29.0	9.6	3.8	-13.8	41.0	7.0	16.3	-1.2	33.0	-5.0	54.8	37.8	27.0	27.0	57.4	50.2	92.0	65.0	70.5	46.5
9	60.5	34.0	45.0	22.0	39.6	9.0	...	...	34.0	-28.9	16.2	2.0	15.0	-21.0	49.8	22.1	68.5	...	60.5	52.3	85.7	48.0	78.5	44.8
10	46.2	35.0	43.9	30.0	28.8	14.0	21.1	-5.0	-9.0	-28.0	17.0	-12.0	7.2	-30.0	53.6	27.3	65.0	31.8	...	38.0	84.5	58.8	66.0	50.0
11	43.1	26.5	54.8	35.0	...	...	...	-17.3	-2.0	-22.0	11.5	-4.2	10.0	-30.2	45.7	22.7	67.4	40.7	69.0	38.0	71.5	51.5	80.0	51.8
12	61.5	...	...	28.8	47.5	21.9	0.7	-12.7	-13.5	-2.5	-12.0	-30.0	9.8	-28.2	60.5	28.5	69.0	37.0	60.8	46.0	74.0	51.0	78.0	57.5
13	60.8	40.9	42.0	29.9	36.0	28.4	12.0	-2.0	-13.0	-26.0	13.0	-21.2	17.0	-26.0	60.3	30.5	69.0	44.0	69.4	38.0	82.5	48.0	78.8	51.0
14	58.0	41.0	47.0	26.8	43.0	23.0	29.0	11.6	-16.0	-43.0	9.0	-15.2	24.0	-9.0	62.2	38.0	53.0	41.1	73.0	49.8	87.0	54.0	72.5	42.5
15	61.6	31.2	37.0	24.0	44.0	23.0	19.0	4.5	-22.0	-43.0	-6.0	-16.0	...	...	65.3	35.7	60.2	40.0	66.0	44.0	97.2	59.2	77.5	45.0
16	63.0	40.1	29.2	5.1	40.6	13.8	10.0	-9.0	-17.0	-40.0	4.5	-10.5	30.0	-5.0	67.0	30.8	60.7	37.3	...	44.0	81.0	40.8	60.5	33.5
17	59.8	30.0	20.9	-2.9	34.5	21.0	...	...	-15.0	-34.9	12.5	-6.5	11.0	-15.0	56.0	26.1	67.6	29.4	74.6	39.5	70.8	48.0	62.5	33.8
18	59.9	33.0	24.4	5.4	36.8	15.8	4.0	-19.0	-12.7	-24.5	11.9	7.0	21.0	0.0	59.3	37.7	70.3	35.0	...	...	74.8	51.0	65.5	39.5
19	69.5	34.0	29.0	14.1	34.0	9.3	3.8	-8.0	-16.0	-33.5	12.0	6.0	29.5	-13.0	51.8	29.0	74.5	45.5	70.2	42.2	77.5	45.6	63.5	37.0
20	58.1	30.0	36.4	23.2	29.4	12.9	5.0	-8.0	-27.0	-47.0	13.6	6.0	25.5	-18.0	56.1	27.6	73.8	36.5	69.0	44.4	67.5	44.0	67.5	35.8
21	61.5	25.0	34.4	19.0	38.0	19.8	-3.0	-20.2	-31.0	-46.2	17.2	0.6	18.5	-4.0	60.5	31.0	73.7	41.6	71.5	41.5	80.0	46.0	72.0	34.5
22	48.3	31.3	21.1	12.8	31.9	4.0	7.5	-8.0	-27.0	-42.0	5.2	-39.2	17.5	0.0	63.8	37.0	67.8	36.8	81.0	50.0	84.5	50.5	76.5	44.5
23	51.0	33.8	23.7	13.0	29.6	15.5	...	...	-20.1	-28.0	0.8	-38.2	33.0	4.5	66.0	30.0	59.5	36.8	84.3	46.5	85.0	50.0	70.5	50.0
24	54.5	35.0	21.3	19.7	32.2	13.4	8.0	-8.0	-16.0	-22.0	-0.3	-27.0	31.0	7.0	58.0	29.2	65.4	44.0	89.0	52.0	87.3	48.5	59.2	35.2
25	49.6	32.0	21.0	6.5	21.2	-15.0	5.1	-7.1	-0.5	-16.0	4.5	-22.0	37.8	4.0	52.5	30.0	71.2	46.2	87.0	57.5	82.5	55.5	68.5	44.0
26	49.2	34.6	17.7	3.9	10.2	-21.5	0.2	-10.1	-8.0	-5.0	16.2	-15.0	50.5	17.0	65.0	36.1	66.5	39.7	77.0	54.5	79.3	59.2	60.0	39.8
27	49.0	34.0	12.0	1.0	-2.0	-18.5	-1.0	-11.0	16.0	...	12.0	-5.5	47.5	20.0	63.5	35.7	68.8	33.8	68.0	54.0	79.0	50.0	59.0	34.0
28	42.7	33.8	19.0	4.0	-2.2	-15.2	-3.5	-9.3	10.5	-5.0	9.2	-8.5	49.0	21.0	66.4	32.0	71.9	37.0	71.5	58.0	80.0	57.5	57.8	28.5
29	44.4	31.0	27.0	8.5	0.2	-22.0	-11.1	-31.6	0.0	-12.2	...	...	55.7	...	65.0	33.3	70.8	47.5	77.0	58.5	74.5	50.0	61.2	33.2
30	41.4	32.2	27.8	8.8	-0.2	-21.5	-3.8	-16.3	11.0	-1.3	52.0	35.0	68.3	39.0	80.2	44.5	76.0	52.0	77.5	53.8	67.0	40.0
31	19.2	5.8	6.1	-24.1	5.5	-22.0	57.5	33.0	81.0	49.0	60.0	50.5	68.5	37.0

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APPENDIX No. 41.

REPORT OF H. W. SELBY, D.L.S.

SURVEYS IN NORTHERN ALBERTA.

TORONTO, March 9, 1907.

E. DEVILLE, Esq. LL.D.,
Surveyor General,
Ottawa, Ont.

SIR,—I have the honour to submit the following report on the survey of township outlines and the subdivision of those lands which in my judgment should be made available, by survey, for immediate settlement at or near the westerly end of Lesser Slave lake, under your instructions dated March 5, 1906, and additional ones sent to Lesser Slave Lake in the following August.

I left Toronto March 8 for Edmonton, where my party was organized, and on March 20 we left for Lesser Slave Lake, where we arrived April 3.

The territory covered by my instructions, namely, that lying to the west of Lesser Slave lake, is composed of a rich soil varying in depth from 3 inches to 12 inches of black loam, upon clay subsoil generally, and lies with a gentle descent towards the east and south. It is very well suited to the purposes of agriculture, mixed farming or stock-raising. Large quantities of hay can be cut and made upon the flat country adjoining the lake, and the higher ground provides abundant pasture for stock on the prairie spots, and amongst the poplar and willow bush which in many places is quite open.

Lesser Slave Lake is now the distributing point for all freight which is required north and west as far as Fort Graham, Fort St. John, Fort Vermilion and Peace River district. As a result a certain quantity of oats is used by teams employed in the freighting business, and, except the small quantity used in stall feeding, there is no market for any more, at a profit. However, when once a railway is constructed, within any reasonable distance, there should be large quantities of oats, wheat, barley and vegetables of all kinds grown, which the soil is, in a high degree, capable of producing. Much speculation is indulged in, as to the future, with regard to the climatic conditions. Frosts occur every month, but this does not affect vegetation, especially that which has become acclimated. Grain and vegetables sown early in the season do not suffer, and ripen before the severe frosts come. Cultivation of the soil will change the climate, and after three years experience in that country my opinion is, that successful farming can be carried on in this district, but until there is an outlet for the produce there is not likely to be a large influx of settlers.

A settlement survey was made in the year 1901, which took in the greater portion of the prairie land surrounding the westerly end of Lesser Slave lake. Many of the lots so surveyed have had settlers living upon them at different times, but with the exception of those owned by the Roman Catholic and English missions, and three old settlers, nothing was grown that was for sale this year, there being no market for it.

The land adjacent to this settlement survey has been subdivided this season, and it is the general opinion that it will soon be occupied after a market has been established.

In addition to these lands, I subdivided township 74, range 16, and parts of townships 74 and 75, range 17, known locally as Prairie River Settlement. In order to do this the outlines of townships 73, ranges 16, 17 and 18 were surveyed. In townships 74 and 75, ranges 16 and 17, several settlers were found with good substantial improve-

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ments. This district is essentially farming land on account of the richness of the soil, while the excellent condition of the stock bears witness to the fattening qualities of the grass and peavine or vetch.

East and West Prairie rivers flowing from the southeast and southwest, join South Heart river flowing from the north, near the northeast corner of township 75, range 17. Each of these rivers flows in a channel about 100 feet wide and within banks from five to ten feet high. The water generally is shallow and seldom over a chain wide, but the sudden melting of the snow, or a two or three days' heavy rain causes the water to rise and almost fill each channel. Had each river an independent outlet to the lake, no flood would take place, but it is impossible for this extra quantity of water to escape through one outlet and the result is the overflowing at certain points, more particularly the north part of township 75 and the south part of township 76, range 16. This flooding is caused to a smaller extent at other parts of these rivers through the large quantities of driftwood becoming jammed, deflecting the water overland and around the obstruction until it again reaches the main channel.

The clearing of this driftwood out of the rivers will render the country alongside less liable to flooding and land now looked upon as valueless will become as good as the best.

There are two very good wagon roads between Lesser Slave lake and the settlements, but bridges will have to be built, to prevent the isolation of settlers for certain periods, at the time of flood, or of the formation and breaking up of the ice in the fall and spring.

The country adjoining the 19th and 20th base lines has been fully described in the reports of survey, and it may be well to add that in this part of the country, as in the most of the townships where bush predominates, conditions will greatly change when the land is cleared and cultivated.

Diligent inquiry and watchfulness failed to elicit any information regarding the proposed route of any railway except that of the Grand Trunk Pacific, which, being near Sturgeon lake, was out of my district.

The irregular boundaries of the several settlement surveys were traversed, and straight lines substituted therefor and permanently marked upon the ground.

Having completed this work I left for Edmonton, discharged my party and arrived in Toronto on the night of December 22, 1906.

I have the honour to be, sir,
Your obedient servant,

HENRY W. SELBY, *D.L.S.*

APPENDIX No. 42.

REPORT OF P. G. STEWART.

EXPLORATION OF THE COUNTRY WEST OF THE HUDSON BAY EXTENSION OF THE CANADIAN NORTHERN RAILWAY, TO THE PAS ON SASKATCHEWAN RIVER.

BRITANNIA BAY, ONT., Feb. 21, 1907.

E. DEVILLE, Esq., LL.D.
Surveyor General,
Ottawa.

SIR,—On August 16, I left Etoimami, the Hudson bay junction on the Canadian Northern railway. After setting up our tents I gathered what information I

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could about the general character of the district I was sent out to explore. From what I could learn it was claimed to be very soft, marshes and muskegs being numerous, especially in the northern section. After getting this information, I considered it advisable to move into 'Thirtymile' creek, and examine the softest ground during the dry weather. Therefore we started by wagon on the right-of-way, following the sand ridge for twelve miles. This ridge is thickly wooded on both sides with small jack-pine, poplar and spruce. We then left the right-of-way and followed the wagon road leading to the north for three miles when we arrived at Overflowing river, where we camped over night. Very hot day.

Aug. 17. This morning we crossed Overflowing river, when we turned east for two miles. We then came to the right-of-way again, and after following this up for two miles, we again turned to the north. The right-of-way here turned to the northeast going into Muskeg swamp; both sides are well timbered with spruce, jack-pine, poplar, tamarack and some scattered white birch of no value, poplar being the prevailing timber. Marshes are numerous. One lake that I noticed, called Ruby, is half a mile wide and five miles long. These marshes are from half a mile to three miles long and from four hundred to six hundred feet wide, they contain water from one to four feet deep, and are surrounded with what they call water grass of no value for feeding purposes. At 2 p.m. we arrived at 'Twentymile' creek, about two miles west of the right-of-way. We passed through some very good spruce and tamarack with gaps of small poplar and jackpine. After taking lunch we proceeded for one and one-half miles. The ground is well timbered with spruce, poplar and jackpine on both sides, poplar being the prevailing timber, the others following in the order named. Marshes and muskegs still continued with gaps of alder, scrub spruce and tamarack of no value. At 7 p.m. we arrived at Fork creek where we camped over night. It rained nearly all day.

Aug. 18. We started at 6 a.m., going through some good large spruce, tamarack and jackpine and arrived at 'Thirtymile' creek at 2 p.m. The last four miles covered is all burnt and a second growth of poplar covers the ground in abundance. Turning east at this point and following down the south bank of the creek for three miles we arrived at the right-of-way again. Rained all forenoon.

Aug. 19. This morning we started at 6 o'clock, going west on the north side of 'Thirtymile' creek. This creek is twenty feet wide at the bottom, and runs in an easterly direction flowing at the rate of three miles per hour. It has an average depth of seven inches; the banks are six feet high and very steep. It would be a fine creek for driving logs. We went through some very large spruce, poplar and tamarack, spruce being the prevailing timber. At noon we passed out of the green timber and into the burnt country, continuing on for two miles through Muskeg swamp, timbered with small scrub spruce and poplar of no value. At 2 p.m. we arrived at the foot of Pasquia hills. After going up a very easy slope for half a mile the hills got very steep, with small poplar very thick. Continuing up for five miles we arrived at the summit about six or seven miles from the foot. On the north side of the valley of 'Thirtymile' creek, the water runs very swiftly. The valley is about six hundred feet wide and one hundred and fifty feet deep. For a long distance to the west, north and east, the country seemed to be all burnt and the Indian who was with us said the burnt district continued as far west as Carrot river. The day was cloudy and dull.

Aug. 20. This morning we travelled north on the top of the hills. Gullies are numerous and average from one hundred and twenty to one hundred and fifty feet deep and from two hundred to six hundred feet wide. In the afternoon we reached the timber again. Very hot day.

Aug. 21. This forenoon we came through some good spruce and tamarack but considerably scattered, tamarack being the prevailing timber. This afternoon spruce and tamarack continued, with openings of spruce and tamarack of no value. In the evening we arrived at the right-of-way. Very hot day

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Aug. 22. This morning we went north between the right-of-way and the meridian line. After travelling for two hours through some spruce and tamarack we came to a small marsh of about four acres, covered with good hay. Passing through small spruce and tamarack for the next two hours, we came to good spruce and tamarack again. This afternoon we did not see much timber of any value, the ground gone over being mostly covered with small spruce, tamarack and brush. Very hot day.

Aug. 23. To-day I am examining the timber west of the meridian. We met with one marsh of about twenty acres, also one muskeg of about one hundred acres covered with brush and eight inches of water. This afternoon we saw considerable good spruce and tamarack. Fine day.

Aug. 24. To-day we travelled north of the timber examined yesterday and found considerable burnt country with small spruce and jackpine of no value. Fine day.

Aug. 25. To-day we moved eight miles north on the meridian line, and also travelled west toward the hills. Saw nothing but open muskeg. Big thunderstorm to-day.

Aug. 26. To-day we went west of the meridian line and encountered small poplar, very thick slash and windfalls, the whole country being muskeg, with two feet of water in places. In the afternoon we reached the top of the hills. The character of the ground is about the same as along 'Thirtymile' creek, gullies are numerous and from one hundred and twenty to one hundred and sixty feet deep and from three hundred to six hundred feet wide and very steep. The ground gone over to-day is burnt and timbered with small poplar of no value. Cloudy to-day, with high wind. Heavy frost last night.

Aug. 27. This morning we passed through large poplar, some spruce and some scattered white birch. Poplar is the prevailing timber. From the top of the mountains we could see a long distance; to the east the country is open with nothing but scrub spruce and jackpine of no value; there is also a large portion of it burnt. We also could see a long ridge of large timber to the north which seemed to be running in a northeasterly direction. We are meeting with some good spruce, but scattered. Poplar is the prevailing timber, there is also some good white birch and scattered balsam. Fine day.

Aug. 28. This morning we went west on the mountains. The timber was about the same as yesterday, with some muskegs from five to twenty acres wooded with small spruce of no value. The character of the ground was the same as yesterday, with gullies from one-quarter to one-half a mile wide and from one hundred and twenty to one hundred and seventy-five feet deep, but very easy of ascent. Fine, but very hot. Heavy frost last night.

August 29.—This morning, one hour after leaving, we came to the upper Pasquia river, which runs in an easterly direction through a large valley nine hundred feet wide and one hundred and forty feet deep, well timbered with large spruce and poplar, the latter being the prevailing timber. The bottom of the stream is sandy, with quite a quantity of boulders, and is thirty feet wide; it is very swift, and has an average depth of fourteen inches; the banks slope gently. We followed down the river on the south side. Large poplar and scattered spruce continued, with some balsam and white birch, very scattered. In the evening we reached the foot of the hills. Some rain to-day.

August 30. This morning we went east along the river. We found large poplar in abundance, with some small bunches of spruce and also some very large scattered trees. The belt of timber on the south side is half a mile wide and the trees are very large; the spruce is very scattered. Showery to-day.

August 31. This morning, half an hour after starting, we came to a bunch of jackpine half a mile wide by half a mile long. At 11 p.m. we reached the meridian line. Going north on the left side there is a small lake about half a mile long and about six hundred feet wide; the land is rolling on the south side, with some scattered jackpine and spruce of a good size. On the west side is a small jackpine plain, and on the southwest side is an alder swamp that seems to extend to the hills. We followed the river for three miles and crossed the meridian line nine times inside of a mile. There

is some very large spruce, but scattered; also poplar in abundance, with considerable white birch of a good size. I am going to examine the country west of the meridian through to Carrot river. To-night we are about the northeast corner of township 51. Cloudy, with wind.

September 1. This morning we went west towards the hills. The ground along both sides of the meridian at this point is covered with small jackpine of no value; for two miles north and south, and for two and one-half miles east and west, the land is sand, with some granite boulders. At one mile west of the meridian and one mile north of Pasquia river there are three small lakes surrounded with brush. After leaving these lakes to the east about half a mile we came to a swamp covered with scrub spruce for half a mile, then with good spruce and poplar for two miles to the foot of the hills. The timber increased in size, poplar still being the principal variety, with some scattered birch and balsam, and some muskegs covered with scrub spruce. The hills were very easy and rolling. Fine day.

September 2. This morning we continued westward. Some spruce and poplar of a good size were still in evidence. Before noon we reached the top of the hills and, turning north, we travelled on the hills about four miles. Poplar is the prevailing timber. We crossed a marsh one mile by one and one-half miles wide, covered with good hay. Fine day.

September 3. We travelled east to-day, descending the hills. The timber on the face of the hills is principally poplar, with some scattered spruce and birch. All afternoon we went through a heavy growth of spruce. Cloudy, with high wind.

September 4. This morning we passed out of the spruce into a tamarack swamp. Considerable of the timber in the swamp is dry, but sound; the green timber is large. The extent of the swamp is about one by one and one-half miles. A great many railway ties could be made here. Cold and cloudy.

September 5. We travelled east this morning to the meridian. Good spruce was still plentiful. On reaching the meridian we travelled north along the east boundary of township 52, range 1. Both sides were well timbered with large spruce, scattered balsam and large poplar. Bright and cold.

September 6. To-day we went west on township 52. There was an abundance of spruce and tamarack all forenoon. At 11.30 we came to a muskeg about twenty acres in extent, covered with small spruce of no value. After passing this muskeg we came to good spruce. During the afternoon we passed out of the thick spruce into some scattered spruce and large poplar, with abundance of white birch. Very hot day.

September 7. This morning we continued westward. Gullies are numerous, from fifty to two hundred feet wide and from fifteen to forty feet deep, steep in some places and in others with easy slope. At noon we turned north. Scattered spruce, poplar and white birch continued. We came to a small lake surrounded with birch and scattered spruce. A small creek runs out of this lake. I could see a long distance to the east. From the foot of the hills the country was all open muskeg, with numerous small lakes. By 8 p.m. we had come north about eight miles. Poplar and spruce continued; the spruce was very scattered and the poplar large and plentiful, with abundance of white birch. Rained hard all day.

September 8. This morning we reached the highest point on the hills. There is a sand bank here about thirty feet above the general level and half a mile long, with an almost perpendicular slope. I could see an abundance of large spruce and jackpine to the west and the valley of Carrot river to the north. At 2 p.m. we descended from the north end of mountains. Large spruce was plentiful, with considerable large balsam. Cloudy and dull.

September 9.—We continued northward this morning. The slope of the hills was very easy and well wooded with spruce, poplar and some scattered balsam and birch. At 4 p.m. we came to the south bank of Carrot river, which is about two hundred and twenty feet wide with banks fifteen feet high and very steep; it seems to be pretty deep. Quite a number of Indians were camped on the north side. On going down the

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north side we found considerable large spruce and poplar, but somewhat scattered. Some rain to-day.

September 10.—This morning we went north towards Saskatchewan river. By noon we had found no timber of any value, the country being all swamp and marshes with considerable good hay. The Indians say there is no timber between Carrot and Saskatchewan rivers in this space. Cold and windy.

September 11.—We got back to Carrot river at 9 o'clock last night; to-day we travelled down the north side of the river. Quite a quantity of large spruce was encountered, but considerable of it has been blown down. I saw at least 12,000,000 feet of spruce to-day that will average one hundred feet for lumber and about 2,500,000 for pulp; also 6,000,000 feet of poplar that will average ninety feet for lumber and about 1,500,000 for pulp. Geese and ducks were very plentiful. Fine day.

September 12.—This morning we made a float and crossed to the south side. Travelling westerly we found poplar in abundance and some large but scattered spruce. Half a mile south the country is marsh and muskeg swamp covered with scrub, spruce brush and some hay. At noon we came to a large space with considerable large poplar. By night we reached the meridian. We saw to-day about 7,000,000 feet of spruce for lumber that will average ninety feet to the tree and 2,000,000 feet for pulp; the poplar will average seventy feet to the tree with about 8,000,000 feet for lumber and 2,500,000 for pulp.

The following statement is an estimate of the timber I have examined north of 'Thirtymile' creek and west of the second meridian. I consider I have gone over ten miles by twenty-four miles, and a total of two hundred and forty square miles. Taking one hundred and forty miles out for waste land and bad timber, we have left one hundred miles of standing timber divided as follows. I have measured in different places 74 acres and found the average dimensions as follows:—

Spruce suitable for lumber (dimension 56 ft.)....	24,000,000	ft. B.M.
Spruce suitable for pulp.. . . .	40,000,000	"
Total.. . . .	64,000,000	"
Poplar suitable for lumber.. . . .	100,000,000	"
Poplar suitable for pulp.. . . .	15,000,000	"
Total (dimension 90 ft.).. . . .	115,000,000	"
Tamarack for lumber (dimension 46 ft.).. . . .	9,000,000	"
Balsam suitable for lumber (dimension 40 ft.).. . .	2,000,000	"
Balsam suitable for pulp.. . . .	4,000,000	"
Total.. . . .	6,000,000	"
Jackpine for lumber (dimension 42 ft.).. . . .	4,000,000	"
Jackpine for pulp.. . . .	5,000,000	"
Total.. . . .	9,000,000	"

	Ft. B.M.
Spruce.....	64,000,000
Poplar.....	115,000,000
Tamarack.. . . .	9,000,000
Balsam.. . . .	6,000,000
Jackpine.. . . .	7,000,000
White birch.. . . .	6,000,000
Total.. . . .	207,000,000

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September 13.—To-day we went south on the meridian. Marshes, muskegs and small lakes were numerous. We reached the southeast corner of township 53, this evening, and saw no timber of any value to-day, with the exception of one small spruce ridge containing about 1,000,000 feet suitable for pulpwood. Fine day.

September 14 and 15.—The last two days I have been travelling east of the meridian and east of township 52. Shortly after starting yesterday morning we passed a small lake surrounded with long weeds and scrub spruce, one mile wide and one mile long. Continuing south and east I found spruce and large scattered poplar with openings of scrub spruce and tamarack. During the last two days we have measured twelve acres in different places, and found the average dimension of spruce sixty-four feet, board measure, to the tree, or a total of 8,500,000 feet for lumber and about 2,000,000 feet for pulp. The average dimension of the tamarack is fifty feet B.M. to the tree, or a total of 4,500,000 feet. A great many tamarack railway ties could be made here. The average dimensions of the poplar is one hundred and twenty feet to the tree or a total of 15,000,000 feet B.M. for lumber and 2,000,000 for pulp. Raining hard the last two days. We carried no tents, as they were too much to carry through the country with little help.

September 16.—This forenoon at 9 a.m. we reached Pasquia river, about five miles east of the meridian. The river at this point runs in an easterly direction and is thirty-five feet wide with steep banks about twelve feet high, has an average depth of 14 inches of water, and runs very swiftly. I could see for a long distance south and east, a low swampy country, covered with brush; we followed down the north bank for three miles, when we came to a lake through which the river runs. On the north side of the lake we came to spruce timber. Showery to-day.

September 17.—I have been examining this spruce to-day. I measured four acres in different places and found the average dimension of trees to be sixty-one feet, or a total of 6,200,000 feet B.M. for lumber and about 2,000,000 feet for pulp. Dimension of poplar seventy-eight feet, 3,000,000 feet B.M. for lumber and 1,500,000 for pulp.

September 18.—Going east towards the railway the country is open, low and swampy with brush and windfalls. At 3 p.m. we came to Little Pasquia river and reached the railway at 5 p.m. The last four miles is low and wet, covered with scrub spruce and moss. Continuing north on the railway, the country is all swamp with the exception of a few low jackpine hills. We are camped to-night four miles south of Seventy-mile store. Cloudy and dull.

September 19.—To-day we travelled on the right-of-way to The Pas. On our left a narrow strip of poplar and spruce was seen. The land was rolling with ridges eight to fifteen feet high, and from fifty to fifteen hundred feet wide. Between the ridges are muskeg swamps, which continue for sixteen miles. For the last two miles the land is sandy and covered with small poplar and jackpine of no value. The dimension of the spruce is about forty-five feet with a total of 1,500,000 feet B.M. for lumber. The spruce suitable for pulp would measure about 3,000,000 feet. The dimension of the poplar is about fifty-five feet with a total for lumber about 2,000,000 feet, and for pulp about 5,000,000 feet. Rained all day.

September 21.—We left The Pas by canoe, going up Pasquia river. The stream for three miles is two hundred feet wide and has a depth of three feet of water; the banks are from six to eight feet high and very steep, and are covered with a strip of small willow brush. Outside of this, the land is low and covered with rich grass, in which we saw countless geese, also black and other ducks; in fact this seems to be a sportsman's paradise. About half a mile farther up the stream it runs very swiftly, with about four inches of water and very soft bottom. Most of the distance for another mile was made by poling, the current being too swift and strong to be overcome by paddling. The banks along here are about fifteen inches high; for two hundred acres on each side the country is very level with not a spear of grass or anything growing. Near the lake the river is two hundred feet wide but very shallow. The land on both sides is very low and covered with rich grass for one mile wide on

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the east side and as far as I could see on the west. The river for the next ten miles is a beautiful stream, the banks on each side being covered with a narrow strip of willows. At 3 p.m. we arrived at 'Seventy-mile' store. The river at this point is half a mile west of the right-of-way. Continuing up stream this afternoon the country had the same characteristics as the lower tract, except that the poplar on the north side is somewhat larger. -Fine day.

September 22.—This morning I crossed to the east side and travelled between the river and the right-of-way. The country is very low and swampy. Continuing towards the right-of-way we came to a strip of good spruce, poplar and tamarack. This strip of timber crosses the right-of-way about six miles north of 'Fiftymile' store and seems to continue east for a good distance. The ridge on the west side is half a mile wide and three miles long. I measured four acres in different places and found the average dimension of spruce trees to be sixty-three feet with a total of 1,500,000 feet B.M. for lumber and about 1,000,000 feet for pulp. The average dimension of the tamarack is forty-nine feet to the tree, and a total of 275,000 feet B.M. The poplar is scattered and will average per tree about eighty feet and a total of 800,000 feet B.M. for lumber. Fine day.

September 23.—This morning half an hour after starting we crossed a big floating muskeg for two miles, with water to the knees. At 9 a.m. we came to a lake about one mile wide and one and one-half miles long, surrounded with small spruce and poplar. Continuing south we came to a spruce and jackpine ridge and on travelling around it I found it contained an area of about four hundred acres. I measured four acres in different places, and the average dimension of the spruce was forty-five feet to the tree with a total of 1,000,000 feet B.M. for lumber and about 600,000 feet for pulp. The average dimension of the jackpine was forty-eight with a total of 700,000 feet B.M. for lumber and 300,000 feet for pulp. On crossing a long narrow floating muskeg to the southwest we came to another small ridge of spruce and jackpine, about two hundred and fifty acres in extent. I measured two acres and found the average dimension of spruce trees to be fifty feet and a total of 1,000,000 for lumber, 400,000 for pulp. The average dimension of the jackpine was fifty-two feet with a total of 600,000 feet B.M. for lumber and 300,000 for pulp. At 1 p.m. we reached the east bank of Little Pasquia river and turned northeast. In the afternoon we reached Pasquia river. The poplar along both sides is plentiful but small, with considerable good but scattered spruce. Fine day.

September 24.—This forenoon we travelled on the north side of the river where there is considerable large spruce and poplar. It is impossible to travel in this district as it is low land and almost covered with water. I have decided to leave it until we get frost. At 2 p.m. we arrived back at the river. Going along the south bank we passed through poplar with gaps of alders and low swampy land to the left. The dimension of the spruce is about fifty feet with a total of 500,000 for lumber with 500,000 for pulp. The dimension of the poplar is about forty feet or a total of 4,000,000 feet for pulp. At 5 p.m. we arrived at the mouth of Little Pasquia river. At this point the main river makes a decided bend to the north, and as the course is fairly straight a charming vista is open to our view; the peaceful, winding river is fringed with meadows of tall grass, and bounded on either side by a good spruce ridge. This afternoon we went up Little Pasquia river. The banks are well timbered on both sides, but with only a narrow strip of spruce, poplar and some jackpine. The land is rolling; the hills will average about twenty feet high, very steep in some places and easy in others. The valleys are from fifty to two hundred feet wide. The river for five miles up from the mouth is fifty feet wide, with high and very steep banks. The water is running about two miles per hour, and has an average depth of eight inches. Cloudy, with strong west wind.

September 26.—Half an hour after starting this morning we came to rapids with very little water. These rapids are from one hundred to five hundred feet in length and continue with gaps of steady water up to the right-of-way, a distance of about ten miles. The bottom consists of small round stones, with very few boulders of any size.

At twelve o'clock we came to a strip of burnt timber about one-half mile wide. To-day we examined the strip of timber along both sides of the river and found that the strip will average about two hundred feet wide, on each side, with gaps of alders and several small creeks coming in on the west side. Outside this strip of timber the land is low and swampy and there is no timber of any value. The river can be made into a good stream for driving logs by building a dam above the railway bridge. It is about fifteen miles from the mouth up to the railway. The dimension of the spruce is about fifty-five feet to the tree and a total of 3,000,000 feet B.M. for lumber and 4,000,000 feet for pulp. The dimension of poplar is sixty-five feet B.M. and a total of 2,000,000 feet for lumber, and 1,500,000 feet for pulp. Jackpine is very scattered and has a dimension of about forty feet, with 300,000 feet B.M. for lumber, and 800,000 feet for pulp.

September 27.—To-day we went down the right-of-way. Both sides are low and swampy. For a distance of five miles south of Little Pasquia it is all open muskeg. We arrived at Thirtymile creek at 8 p.m. We saw no timber along the line to-day of any value. There are deposits of limestone in several places along the right-of-way, between Thirtymile creek and Fiftymile creek. It seemed to be all in small boulders and some of the railway men informed me that it was of no value.

ESTIMATE OF STANDING TIMBER EAST OF THE SECOND MERIDIAN AND NORTH OF THIRTYMILE CREEK AND SOUTH OF PASQUIA RIVER TO THE PAS.

I have measured forty-one acres in different places and found the dimensions as follows:—

	Feet, B.M.
Spruce suitable for lumber, average 55 feet, total.	23,200,000
Spruce suitable for pulp, average 55 feet, total	13,000,000
	<hr/>
	36,200,000
Poplar suitable for lumber, average 95 feet, total.	22,800,000
Poplar suitable for pulp, average 95 feet, total.	14,000,000
	<hr/>
	36,800,000
Jackpine suitable for lumber, average 50 feet, total	1,600,000
Jackpine suitable for pulp, average 50 feet, total	900,000
	<hr/>
	2,500,000
Tamarack suitable for lumber, average 50 feet, total..	4,775,000
	<hr/>
Total.	80,275,000

All the land gone over is low and swampy, with the exception of Pasquia hills, which are all sand. I saw no land of any value for agricultural purposes north of Thirtymile creek.

September 28.—Some frost last night. Travelling south from Thirtymile creek we came to a strip of large spruce and poplar about one-quarter of a mile wide and extending back west about three miles. There is also considerable small spruce suitable for pulp wood. For one mile west of the right-of-way the land is level, and for the next two and one-half miles the land is rolling with gullies about eight feet deep and five feet wide. At three miles from the right-of-way is the north end of the sand ridge that extends to Etoimami. South of this strip of timber there is a strip of burnt timber about one and one-half miles wide. Passing over this, we came to jackpine, spruce and poplar in abundance. At 10 a.m. we came to a large creek running to the east, with a current of six miles an hour. This creek is thirty feet wide and has an average depth of six inches of water. Its banks are three feet high and extend back for fifty feet, where they rise to a height of thirty feet and are very steep. The bottom is gravel and it can be made a good stream for driving timber with very little expense. The Indians say this stream is a continuation of Little Pasquia river. Going up the

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stream for another one and one-half miles, large spruce and poplar is plentiful with some scattered balsam of a good size. Fine day.

September 29.—To-day we followed up the creek. The land is very low, swampy and burnt, with scattered large spruce and balsam. About 9 a.m. we came to the foot of Pasquia hills. The country rises at an easy slope for one-quarter of a mile, is very level for the next one and one-half miles, and then gets much steeper for the next two miles. Here the gullies are about one hundred feet deep and four hundred feet wide and are very numerous. The sides are very easy of ascent and are wooded with small poplar in abundance, but of no value. The river runs through a very large valley six hundred feet deep and two thousand feet wide, with gently sloping sides. Cloudy and dull.

September 30.—Some frost last night. This forenoon we went south on hills for about five miles. The character of the ground was much the same as that gone over yesterday. This afternoon at 1 p.m. we turned east and descended the hills. Going down at easy slopes we reached the foot at 5 p.m. It is very low, wet swampy land, well timbered with spruce and poplar, spruce predominating. Fine day.

October 1.—This morning about one hour after starting we passed out of the spruce and tamarack which continued. We next came to a big marsh about one mile by four miles. This marsh contains considerable water and is covered with water grass. For the next two miles the ground is well timbered with spruce, poplar and some tamarack. Passing out of the timber we came to a marsh about half a mile by one mile, also containing water and water grass. Following for six hundred feet down the creek, which runs out of the marsh, we came to another creek coming in from the southwest. We came also to the sand ridge and wagon road. The ridge is twenty feet high and six hundred feet wide, and is well timbered with large spruce. The timber continues to the right-of-way, a distance of about two miles. This creek is twenty feet wide and has banks four feet high which slope gently. The average depth of water is four inches and the current is six miles an hour. Cloudy and dull.

October 2.—We travelled three miles north this morning on the right-of-way and found spruce and poplar plentiful. Turning west and following up the creek we went for three miles and found abundance of spruce and poplar. At noon we reached the sand ridge and wagon road. At 12.30 we started south on the wagon road and continued for four miles. Both sides were well timbered with large spruce and poplar, and some jackpine. At 4 p.m. we left the wagon road and travelled west. The land was low and swampy with ridges of spruce, poplar and jackpine and open spaces covered with scrub spruce and tamarack. Some rain to-day.

October 3.—At 8 a.m. we reached the foot of the hills. The hills are steep and wooded with scattered large spruce and poplar. The poplar does not look to be very sound. We felled three trees; two were twenty-four inches and one twenty-five inches at the butt. We found them very rotten at the top and shaky at the butt. Continuing we found the hills very steep and covered with brush so thick that it was almost impossible to get through. At noon we reached the top and found spruce and poplar, scattered and not very healthy looking. A large area of the hills here is burnt. Continuing west we found the spruce more plentiful and larger. At 3 p.m. we came to burnt country, and as far west as I could see it is all small jackpine, of no value. Turning south and going through the small jackpine for the next three hours we came to a very large valley four hundred feet deep and 3,000 feet wide. The land is sand with a great many large land slides. Letting ourselves down the bank we found a creek running to the east. It is twenty-five feet wide, with an average depth of seven inches of water and a rapid current.

October 4.—This morning we climbed up the south bank. It is wooded with scattered spruce, poplar and white birch. Going west on the south side we found considerable spruce and large poplar ridges, and a large portion of the country burnt. The land is pretty level. We crossed a few gullies about fifty feet deep and four hundred feet wide. They were steep and timbered with small poplar of no value. At 6 p.m.

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we came to a muskeg where we camped for the night. Some light showers to-day. Moose very plentiful.

October 5.—This morning going east we crossed one gully about 175 feet deep and 500 feet wide. The slope was pretty steep and it was wooded with small poplar and spruce of no value. At 9 a.m. we came to open sand plains, with ridges of large spruce and poplar. At 5 p.m. we came to the creek we crossed yesterday morning running in a southeastern direction. The valley of the creek here is about 40 feet wide at the bottom, and two hundred feet deep and very steep. The creek is about the same size as where we crossed it farther west, but it does not run so swiftly and has a sand bottom. Rained hard all day.

October 6.—At 9 a.m. we reached the foot of the hills. The land is level but low and swampy, with some good spruce and poplar. At 12 o'clock we were in spruce in abundance. We then crossed two open muskegs of about fifty and seventy-five acres respectively, and covered with moss, small spruce and tamarack of no value. At 6 p.m. we were still in the spruce. Rained all day.

October 7.—This morning we passed out of the spruce into a very wet small spruce swamp one mile wide. We next came to an open swamp about half a mile by half a mile, covered with moss, with large spruce and poplar on our right and left. At 2.30 we came to a sand ridge wooded with small poplar and scattered large spruce. The ridge is 10 feet high and 600 feet wide. The east slope descends into a swamp wooded with tamarack and scattered spruce. Still going east the land is low and swampy for one mile. We reached the right-of-way at 5 p.m. The last mile was well timbered with spruce. Some rain to-day.

October 8.—Snowed all day. Remained in camp.

October 9.—This morning we went south on the right-of-way. The timber is small spruce and poplar, suitable for pulpwood. At 9 a.m. we came to Twentymile creek. Going west up the right bank we found the poplar and spruce very scattered, but on the left bank it was very large and plentiful. Proceeding for one and one-half miles we came to a sand ridge about half a mile wide with easy slopes. The creek is thirty feet wide. Its banks are very low on the north side and on the south side they are about 6 feet high with easy slopes. The creek has an average depth of 8 inches of water and runs very swiftly; the bottom is small boulders and gravel. It is a good stream for driving timber. Cloudy, with west wind.

October 10.—This morning we followed up the creek on the right bank. We found large jackpine very plentiful for one mile. Following up the stream for three miles we came to the forks. Proceeding up the right branch we found large spruce and poplar were very plentiful, with spruce predominating, also hazel brush very thick and hard to get through. At 12 o'clock we were still in the spruce. At 4 p.m. we passed out of the thick spruce, and into scattered large spruce and poplar, with poplar predominating. Following up the creek we found the hills on each side about one hundred and fifty feet high very steep on the south side, and easy on the north side, and about ninety feet wide at the bottom. Fine day.

October 11.—We climbed up the south bank this morning and went west for one mile through burnt timber, with scattered ridges of large spruce and poplar. Proceeding southwest for two miles we came to a marsh covered with brush. Crossing the marsh to the southwest we came to large poplar and spruce, poplar being the prevailing timber. The land is level and sandy and has also much small poplar, which, however, is of no value. We next crossed three open muskegs of about five, ten and twenty acres respectively. The land covered to-day is burnt in many places. Fine day.

October 12.—This morning we travelled west for four miles. It is nearly all burnt country, with some scattered spruce and poplar. At 4 p.m. we came east crossing some gullies, from twenty-five to one hundred feet deep, and from one hundred to six hundred feet wide with easy slopes. These gullies are wooded with small poplar and scattered large spruce. Fine day.

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The timber area north of Twentymile creek and south of Thirtymile creek is not over five miles.

	Ft. B.M.	Ft. B.M. Dimension 56 ft.
Spruce suitable for lumber.. . . .	9,000,000	
Spruce suitable for pulp.. . . .	10,000,000	
	<hr/>	19,000,000
		Dimension 78 ft.
Poplar suitable for lumber.. . . .	15,000,000	
Poplar suitable for pulp.. . . .	10,000,000	
	<hr/>	25,000,000
		Dimension 50 ft.
Jackpine for lumber.. . . .	4,000,000	
Jackpine for pulp.. . . .	3,000,000	
	<hr/>	7,000,000
		Dimension 45 ft.
Tamarack for lumber.. . . .		1,000,000
		Dimension 40 ft.
Balsam for lumber.. . . .	200,000	
Balsam for pulp	300,000	
	<hr/>	500,000
Total.. . . .		<hr/> 52,500,000

October 13.—One hour after starting this morning we came to the south branch of Twentymile creek. It runs a little north of east and is about the same size as the west branch. It has an average depth of eight inches of water, the current is swift and it is a good creek for driving timber. The valley is about one hundred and twenty-five feet deep and pretty steep, and is about seventy feet wide at the bottom. The valley is wooded with scattered spruce, poplar and some birch. The country for the next six miles is timbered with poplar and scattered spruce. Showery to-day.

October 14.—At 8 a.m. we reached the summit of the mountain. From there we could see a large green country to the east, seeming to extend for some distance east of the railway line. We could also see a lake about twelve miles to the southeast. I presume this is Leaf lake. It is surrounded for a great distance with large timber. Descending the mountains through large spruce and poplar for one mile we came into large jackpine for another mile. Still following down the stream we found the country well timbered with large spruce. At 2 p.m. we came to a fork. From there we went southeast for two hours through good sized spruce and poplar with gaps of open muskeg covered with scrub spruce and tamarack. We reached the sand ridge and wagon road at dark. Some rain to-day.

October 15.—The sand ridge here is five hundred feet wide and twenty feet high, and is wooded with small spruce and poplar suitable for pulpwood, also some jackpine of no value. After leaving the ridge large poplar is plentiful, with some good sized spruce and tamarack. The poplar extends to the right-of-way, a distance of about two and one-half miles. We went south on the right-of-way for three miles and found it timbered with scrub spruce and tamarack. Fine day.

October 16.—Going west this morning for one and one-half miles through swamp and scrub spruce, we came to a tract of country about one and one-half miles in extent covered with spruce, large and plentiful. Continuing we came to a jackpine ridge about five hundred feet in width wooded with small timber suitable for pulpwood, after this we came to large spruce again for another mile and reached the same ridge and wagon road at 5 p.m. Fine day.

October 17.—This morning after crossing a marsh covered with water grass and containing twenty inches of water we came to large spruce again in abundance for

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three miles. We then crossed a small open muskeg for one-quarter of a mile, and came into country covered with scattered spruce with considerable poplar. This lasted for about a mile till we came to the foot of the hills. Fine day.

October 18.—Proceeding west this morning we went up hills with a gentle rise. The poplar was plentiful with scattered large spruce and very thick hazel brush. Continuing for two hours, at 9 a.m. we reached the top of the hills, which were covered with large spruce and poplar. At noon we came to an alder swamp with a small stream running south. At 5 p.m. we came to a muskeg covered with scrub spruce. Continuing we passed through large spruce in bunches and scattered poplar. The land covered this afternoon was level and swampy. Fine day.

October 19.—Going west this morning for one mile through a small spruce swamp, we came to a burnt country with scattered ridges of good large poplar. Spruce is not very plentiful. At noon going south for three miles we crossed three steep gullies with an average of 75 feet in depth and 450 feet in width. At 10 a.m. we came to the west branch of Overflowing river, running in an easterly direction and very steady. The river is 20 feet wide and the water is 15 inches deep. The valley is 40 feet deep and 400 feet wide and has easy slopes which are timbered with scattered spruce, poplar and some white birch. We crossed over to the south side and went through scattered spruce and poplar for two miles. A great deal of the land has been burnt over. We came to the south end of the mountain, and from there could see a long distance to the south and west. Marshes and muskegs are numerous. At 4 p.m. after going east on the top of the mountain for two miles we came to the west branch of Overflowing river again. Fine day.

October 20.—Going east this morning we found the brush hard to get through. The spruce and poplar is large but scattered. At 2 p.m. we descended from the mountain. The mountain side was rolling and had an easy slope. The valley of the river is not so large as it is farther west. We reached the foot of the hills at dark.

October 21.—This forenoon we followed a large spruce and poplar ridge. On the south is a big alder swamp. At noon we came to the forks. The east and west branches are about the same size. The main stream below the forks is 40 feet wide. The banks are 15 feet high and very steep. The water is running at the rate of four miles an hour and has an average depth of 2 feet. This afternoon we went in a northeasterly direction. For the last two miles we met with scattered large spruce and poplar. At 2 p.m. we came to a swamp half a mile in extent and covered with considerable water. We then came to a burnt country; the land is level and sandy. Wolves are numerous. Fine day.

October 22.—One hour after starting this morning we came to an open muskeg, with 8 inches of water and extending for two miles. We then came to a sand flat three miles in extent and covered with small poplar of no value. At 5 p.m. we came to Overflowing river, two miles west of the right-of-way. The river along here is flat rapids, with an average depth of 10 inches of water. The bottom is very stony with a considerable quantity of large boulders. It is a good river for driving timber. At 5.30 we reached the sand ridge and wagon road. The ridge here is 1,000 feet wide and 25 feet high, and is timbered with scrub, poplar and jackpine. The bank of the river is 15 feet high and is very steep. Fine day.

October 23.—We reached the right-of-way at 8.30 a.m. There is no timber of any value between the right-of-way and the wagon road. We went south on the right-of-way for three miles, then turned west and crossed a marsh at the north end of Ruby lake covered with water grass and considerable water. After crossing the marsh we came to small poplar, which continued for four miles. We then came to another marsh which is about one mile by three miles and is covered with brush and water grass. Then for two miles spruce was very plentiful and following this came a big muskeg three miles by four miles, covered with moss and with water to the knees. Going from there in a northwesterly direction we came to the south fork of Overflowing river, about one mile west of the forks. We also came to the new limit line,

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running east and west. Going up on the south bank of the river, we found spruce and poplar very plentiful for two miles, the last mile being chiefly spruce. After this we came to a muskeg two miles by three miles covered with moss and scrub spruce, and surrounded by ridges covered with scattered large spruce and poplar. Fine day.

October 24.—We continued up the south bank through spruce and poplar for four miles. After going for three miles the timber became very scattered and here the river takes a decided bend to the south. We went on for two miles more and continued to find scattered spruce and poplar. Fine day. The timber area south of Twentymile creek and north of Overflowing river is about eight miles square.

	Ft. B.M.	Ft. B.M. Dimension 60 ft.
Spruce suitable for lumber.. . . .	15,000,000	
Spruce suitable for pulp.. . . .	9,000,000	
	<hr/>	24,000,000
		Dimension 100 ft.
Poplar suitable for lumber.. . . .	20,000,000	
Poplar suitable for pulp.. . . .	15,000,000	
	<hr/>	35,000,000
		Dimension 40 ft.
Jackpine suitable for lumber.. . . .	1,500,000	
Jackpine suitable for pulp.. . . .	2,000,000	
	<hr/>	3,500,000
		Dimension 40 ft.
Tamarack suitable for lumber.. . . .		2,000,000
		<hr/>
		64,500,000

October 25.—This morning we crossed to the west side of the river. The water is 3 feet deep and very steady ; it is 25 feet wide; the banks are 15 feet high and very steep. Continuing west we passed a small lake to the east, one mile by one and one-half miles, surrounded with good hay, and with a spruce ridge to the north. Going west the timber continued all afternoon. The ground covered to-day is low and swampy. Fine day.

October 26.—We travelled west to-day through groves of spruce, scattered poplar and opening tracts of scrub spruce and tamarack. The ground covered to-day is swampy and wet. At 5 p.m. we came to an open muskeg with eight inches of water, and covered with scattered scrub spruce. Fine day.

October 27.—We went south this morning through scattered spruce and poplar and considerable spruce. At 10 a.m. we came to the south branch of Overflowing river again. Both sides are covered with alder for a space of one thousand feet. The banks are twenty feet high and very steep. The stream is twenty feet wide and has an average of six inches of water and a current of two miles an hour. At 11 a.m. from the south side of the river, we went east through spruce and poplar. Poplar was the prevailing timber to-day. Land low and wet. Fine day.

October 28.—We went east this morning through country where spruce and poplar is plentiful with some scattered tamarack. We crossed three muskegs having an average of twenty acres each. The land is low and swampy. At 6 p.m. we reached Ruby lake about the centre on the west side. For the last two miles the spruce is thick, but not very large. Snowing and wet all day.

October 30.—We came to Etoimami and stayed there as it snowed and rained all day.

October 31.—We went west along the railway for twelve miles. The land was all swamp and the timber was principally poplar with some spruce and scattered tamarack.

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At 4 p.m. we were going north through a low swamp with water six inches deep, and broken by small poplar ridges. The spruce is very scarce; some has been cut. Cloudy and cold.

November 1.—Going west this morning we crossed a creek running in a southeasterly direction. I presume it is Fir river. It is fifty feet wide, has banks from eight to ten feet high, an average depth of ten inches of water, and a current of four miles an hour. Going east through scattered poplar and spruce for two miles, we came to a marsh surrounded with good grass and containing fifteen inches of water. Cloudy and cold.

November 2.—We travelled to-day in a northeasterly direction through thick poplar and small spruce. We crossed two muskegs covered with water and moss to the knees. The country covered to-day is low and swampy, and much the same as that covered yesterday. It is fairly well timbered with poplar, some scattered spruce and a great quantity of small stuff of no value. At 5 p.m. we reached Etoimami.

Estimated quantity of standing timber south of Overflowing river and north of Etoimami:—

	Ft. B.M.	Ft. B.M.
		Dimension 54 ft.
Spruce suitable for lumber.. . . .	10,000,000	
Spruce suitable for pulp.. . . .	15,000,000	
	<hr/>	25,000,000
		Dimension 59 ft.
Poplar suitable for lumber	15,000,000	
Poplar suitable for pulp.. . . .	20,000,000	
	<hr/>	35,000,000
		Dimension 40 ft.
Tamarack suitable for lumber.. . . .	5,000,000	
		Dimension 36 ft.
Balsam suitable for lumber.. . . .	2,000,000	
Balsam suitable for pulp.. . . .	3,000,000	
	<hr/>	5,000,000
		Dimension 32 ft.
White birch suitable for lumber.. . . .	1,000,000	
	<hr/>	71,000,000
Total estimate north of Thirtymile creek and west of meri-		
dian line		207,000,000
Total estimate north of Thirtymile creek and east of meri-		
dian line and south of Pasquia river.. . . .		72,975,000
Total estimate north of Etoimami and south of Overflow-		
ing river.. . . .		71,000,000
	<hr/>	
Total.. . . .		350,975,000

November 3-21.—We were unable to proceed with the work until it froze up. During part of this time I had leave of absence. The rest of the time was spent on the journey to and from home.

November 22.—We left Etoimami by train, on The Pas extension of the Canadian Northern Railway. Snowing and cold.

November 23.—We arrived at Thirtymile creek at 10 a.m. After lunch, we started north and followed the 2nd meridian line for three miles, where we camped over night. Very cold.

November 24.—To-day we went about seven miles. The snow is three feet deep, and there was quite a number of trees across the line. Very cold east wind.

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November 25.—We went about eight miles to-day and camped on the bank of a stream they call Cross creek, about the northeast corner of township 53. Very cold.

November 26.—Cross creek is about fifteen feet wide, has an average depth of three feet of water, and is very steady. This stream runs in an easterly direction and flows into Pasquia river about two miles east of the meridian line. The banks are three feet high and slope gently. To-day we went west up the creek. The banks are well timbered on each side with spruce and some tamarack. On the left, outside of the ridge of timber, which is about four hundred feet wide, is a marsh one-quarter of a mile wide by three-quarters of a mile long. On the south side of the marsh, spruce and poplar are very plentiful. Continuing up the creek we came to three marshes, one extending to the north for six miles and about one-quarter of a mile wide. It is covered with brush, and is wooded on the west side with small tamarack. On the east side the tamarack is still smaller, with open muskeg and scrub spruce. The other two marshes are floating muskegs covered with moss. These marshes are about two miles west of the meridian line. This afternoon we went east on the north side of Cross creek. We went through open muskeg and scrub spruce, and passed several small lakes, reaching the meridian line at dark. Snow three feet deep. Very cold.

November 27.—This morning we went east on the meridian line for two miles and then leaving the line we turned west. We found spruce, poplar and tamarack very plentiful. At noon we reached the foot of Pasquia hills, and went up the mountains for two miles. The ground rose gradually and is covered with spruce in abundance, and considerable large balsam. We went north for the next hour, over some small gullies about 8 feet deep and 30 feet wide, with easy slopes. At 4 p.m. we came to a small creek and camped. This creek is a continuation of Cross creek, and runs through the long marsh running west, two miles west of the meridian line. The valley is 6 feet wide at the bottom. The banks are 8 feet high and very steep. It contains no water. Spruce and balsam are very thick, with scattered poplar and white birch. Bright and cold.

November 29.—We came east to-day on Cross creek. Spruce was very plentiful on each side. There was also some scattered tamarack. At 10 a.m. we came to Pasquia river, about two and one-half miles east of the meridian line. Timber can be driven down Cross creek from the marshes for about four and one-half miles. We went up Pasquia river for four miles. There is a narrow strip of spruce along each side. Here the creek gets very narrow and its banks are densely covered with willow brush. Outside this strip of timber is low swampy land covered with alder and some hay. Very cold with east wind.

November 30.—We went east to-day, through low swampy land, covered with brush and scattered spruce. At 11 a.m. we came to another creek, running in a northerly direction. This creek is 15 feet wide. The banks are 5 feet high and slope easily. We followed this stream up for half a mile, through some scattered spruce on each side. It then gets very narrow and the banks are covered with brush. Turning back we followed the stream down for two and a half miles. For three-quarters of a mile the banks are well timbered on each side with spruce and tamarack. I have measured eight acres in different places, and found an average of 48 feet to the tree for spruce with 4,000,000 feet for lumber and 3,000,000 for pulp. Tamarack averages 42 feet to the tree with 1,500,000 feet B.M. for lumber. Bright and cold.

December 2.—We went north to-day. It was all open country and we saw no timber of any value. Snowed to-day.

December 3.—This forenoon, going north, we crossed four small lakes surrounded by scrub spruce. This afternoon at 3 p.m. we came to another lake a half mile wide by one mile long. Following up this to the north for a half mile we came to a creek surrounded with long yellow weeds, one-half mile farther we came to a big marsh. Snowed to-day.

December 4.—This morning we travelled north through swampy land and some scattered spruce ridges. At 11 a.m. we came to a tamarack swamp, about one mile

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square. This swamp contains about 1,500,000 feet for lumber and the trees will average 48 feet B.M. We came to a small creek at dark. Fine day.

December 6.—We followed down the creek for half a mile, through country covered with small poplar suitable for pulpwood and then came to a lake about one mile wide by one mile long. On the southwest side there is small spruce of no value. On the north side there is a small bunch of spruce covering an area about a half mile wide by half mile long. The average dimension is about 46 feet B.M. with 500,000 feet for lumber and 300,000 feet for pulp, and 1,000,000 feet of poplar for pulp. Very cold day.

December 7.—We went east this forenoon through open muskeg. At noon going southeast we came to a spruce and poplar ridge and followed along this ridge till dark. Very cold.

December 8.—Going in a southerly direction for three hours this morning, we came to a river running southeast. It was timbered well on each side with large spruce, poplar and some scattered balsam. This stream is 40 feet wide and about 8 feet deep, and the banks are 8 feet high and very steep. There does not seem to be any current. The water is bad, has a bad smell, and turns black when boiled. We followed down the stream through abundance of spruce and poplar. Spruce is the prevailing timber and is quite large. Very cold day.

December 9.—We continued down the river through spruce and scattered large poplar. A big muskeg was on our left. Very cold day.

December 10.—We continued down the river to-day about four miles. Spruce was plentiful, with a few gaps from 100 to 500 feet wide of small poplar. The big muskeg was still on our left. Very cold.

December 11.—To-day we continued down the river. At 4 p.m. we passed out of the spruce. I measured six acres and found for spruce an average of 62 feet B.M. and 9,000,000 feet for lumber, and 3,000,000 feet for pulp. The poplar averages 66 feet with 3,000,000 feet for lumber and 2,000,000 feet for pulp. The snow was 2½ feet deep on the ridges. Snowed to-day.

December 12.—We came north this morning for three miles through low land covered with willow brush. Continuing we came to a spruce ridge running north and followed the ridge till dark. The timber along this ridge is very plentiful. Cold day.

December 13.—We followed the spruce ridge all day. Very cold.

December 14.—At 3 p.m. we passed out of the spruce into an alder swamp a half mile in extent. Continuing we came to a big marsh containing a large quantity of good hay. There was a small lake at the south end. This spruce ridge is about eight miles long, and is on an average of half a mile wide. The average dimensions for spruce is 53 feet B.M. with 4,000,000 feet for lumber and 3,000,000 for pulp. The average dimensions for the poplar is 66 feet with 8,000,000 for lumber and 4,000,000 for pulp. Bright and cold.

December 15.—This morning we were in the spruce at the south end of the marsh. There is considerable spruce scattered all over this district. I have seen to-day about 1,000,000 feet for lumber, average dimensions, 55 feet B.M., and 1,500,000 feet suitable for pulp. Poplar will average 55 feet B.M. with 3,000,000 feet for lumber, and 4,000,000 for pulp. Very cold.

December 16.—We went west to-day. We were going through brush all forenoon and at noon came to a lake, on the south side of which there is considerable spruce. On the north side there is open muskeg with considerable brush. The spruce will average 52 feet and about 300,000 feet for lumber and 500,000 feet for pulp. This afternoon we went northeast and came to the marsh that we crossed yesterday morning. Very cold.

December 17.—After crossing the marsh we came to the river. The ice is very bad here. Still continuing northeast for two miles through some good spruce and poplar, we came to a big open muskeg covered with brush, after which we came to numerous small lakes with a good many small islands. These islands are wooded

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with small spruce of no value. Travelling farther north we reached the northeast corner of the muskeg at dark. Fine day.

December 18.—About half an hour after leaving the marsh we came into very thick brush for half a mile. Next we came to spruce and poplar, spruce being the prevailing timber. Following the ridge for another mile, the spruce became very scattered, and the poplar more plentiful. This afternoon poplar was the prevailing timber the spruce being very scattered. Bright and cold.

December 19.—We followed the ridge all day and the timber was principally all poplar with very few spruce. Snowed to-day.

December 20.—This morning we went in a northerly direction, and at 8 a.m. we came to some good large spruce. After travelling through it we found the area to be about two miles square. It contains six million feet for lumber, average dimension about sixty feet, also two million feet for pulp. Bright and cold.

December 21.—Going east this morning for half an hour, we came to open muskeg. This extends as far as I could see, and I presume that this is the open country that connects with The Pas lake. I think that this is about twenty miles east of the meridian, and about two miles south of Carrot river. Going west this afternoon we came at three p.m. to the ridge we left yesterday. We followed this ridge till dark through poplar with very few spruce. Bright and cold.

December 22.—To-day we followed the poplar ridge. There was a big open muskeg on our right. Spruce was very scarce. Very cold.

December 23.—To-day we still followed the ridge. The poplar was very large. Cloudy with west wind.

December 24.—This forenoon the ridge turned considerably to the south, following round the east end of the marsh. At 3 p.m. we passed out of the poplar, into spruce, and reached 'Bad Water' river at 4 p.m. This ridge is twelve or thirteen miles long, and is on an average three-quarters of a mile wide. The poplar will average about seventy feet in dimension, with twelve million feet for lumber and four million feet for pulp. The spruce will average about sixty feet in dimension with two million feet for lumber and one million feet for pulp. Bright and cold.

December 26.—This morning we crossed the river, and came west through low swampy land. We saw no timber to-day of any value. Mild to-day.

December 27.—We came west to-day for six hours, through low swampy land, with considerable scrub spruce. At 2 p.m. we came to scattered spruce, and remained in the scattered timber the rest of the day. Snow to-day.

December 28.—This forenoon we were still in the scattered spruce. This afternoon we remained in camp. Very stormy, with strong east wind.

December 29.—To-day I examined the scattered spruce and poplar. Snowed hard all day.

December 30.—We reached Pasquia river at 2 p.m., coming through scattered spruce and poplar. The snow was three and a-half feet deep, which made the travelling hard. Snowed all day.

December 31.—We were still in the timber to-day. The poplar was plentiful and the spruce very scattered. Snowed and was very cold.

January 1.—We moved two miles up the river to-day. The banks were wooded with brush and there was considerable hay. This afternoon we travelled north of the river. The country was the same as yesterday. Very cold day.

January 2.—We moved down to the rapids to-day. The poplar and spruce was more plentiful here. Extremely cold.

January 3, 4 and 5.—We examined the timber north and east of the rapids during the last three days. There was quite a quantity of spruce and the poplar was plentiful. We have been in scattered timber for the last ten days. Dimensions of spruce sixty feet, and six million feet for lumber, and one million feet for pulp. Dimensions

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of poplar fifty-five feet and ten million feet for lumber and five million feet for pulp. Last three days very cold.

January 6.—We moved six miles down the river to-day. The banks were well timbered with poplar. Very cold.

January 7.—We went north about three miles, through low swampy land. Very cold.

January 8.—We went in a southeasterly direction through some small poplar of no value, and got back to Pasquia river at dark. Very cold.

January 9.—We went down the river and reached 'Seventymile' at 5 p.m., where I expected to get some provisions, but found the place deserted. Snowed all day.

January 10.—We reached The Pas at 1 p.m. Very cold, with north wind.

January 11.—We left The Pas this morning, and reached the end of the steel at 8 p.m., thirty miles south of The Pas. Thermometer showed 48 below to-night.

January 12.—We left for Etoimami by train. Very cold.

January 13.—We reached Etoimami. Very cold.

January 14.—We remained at Etoimami waiting for the train.

January 15.—We left Etoimami and reached Winnipeg on the 18th. We left Winnipeg and reached Ottawa on January 21, 1907.

Estimated quantity of standing timber east of the second meridian and north of Pasquia river:—

Spruce suitable for lumber.....	32,800,000 ft.
“ “ pulp.....	16,200,000 ft.
	<hr/>
	49,000,000 ft. B. M.
	Dimension 53 ft.
Poplar suitable for lumber.....	36,000,000 ft.
“ “ pulp.....	19,000,000 ft.
	<hr/>
	55,000,000 ft. B. M.
	Dimension 62 ft.
Tamarack for lumber..	3,000,000 ft. B. M.

Total estimated quantity of standing timber north of Etoimami and west of the Hudson bay extension of the Canadian Northern railway to The Pas on Saskatchewan river:—

Spruce	217,700,000 ft. B. M.
Poplar	301,800,000 “
Tamarack.....	24,775,000 “
Balsam	16,000,000 “
Jackpine	20,000,000 “
Birch	7,000,000 “
	<hr/>
	587,275,000 ft. B. M.

I have the honour to be, sir,
Your obedient servant,

P. G. STEWART.

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APPENDIX No. 43.

REPORT OF W. THIBAudeau, C.E.

EXPLORATION SURVEY OF THE COUNTRY LYING BETWEEN FORT CHURCHILL AND THE PAS

OTTAWA, May 10, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of my exploration survey of the country lying between Fort Churchill on Hudson bay and The Pas on Saskatchewan river, undertaken in accordance with your instructions of July 26, 1906.

I left Ottawa on July 27, 1906, and arrived at Halifax on July 28, 1906. I sailed from Halifax to Hudson bay on August 1, 1906, and arrived at Fort Churchill on September 2, 1906.

I was informed by the Hudson bay people, that all the Indians had left the fort a week before, and also, being short of provisions, they could not supply me with provisions for any length of time, nor with any men or dog teams. I was therefore compelled to endure delay as to commencing any exploration from Churchill to The Pas until I could secure help, and outfit, necessary to the accomplishment of the trip. In the meantime I made a detailed exploration of Churchill and surroundings and of Churchill harbour. I left Churchill for The Pas on January 2nd, 1907, and arrived at The Pas February 16, 1907.

Fort Churchill Harbour.

This harbour can be kept open all the year by the employment of ice breakers. Last year, 1906, the harbour closed between December 5th and 10th. The conditions, January, 1907, were as follows: In the bay at Fort Churchill the ice was eleven inches thick. It extended for a third of a mile from the shore into the bay. Ice was much thinner in the bay than in the harbour. There was some floating ice about a quarter of a mile from the edge of the bay ice. This is sent in by a northerly wind; should the prevailing winds blow from any other direction, there would be no floating ice. Beyond this floating ice there was clear open water straight away into the bay and beyond. This was the general condition up to and including January 2, 1907. An ice breaker similar to either the *North* or *South*, now in use between Quebec and Lévis, would, by making two trips a week, keep the harbour open the year round.

The neap tide is twelve feet and the spring tide sixteen feet. The average current in the harbour, with the tide running out, is six knots. This current would materially assist in keeping the channel free from ice; after it was broken by the ice breaker the tide would carry it out.

The Churchill river freezes about one month before the harbour, with the result that there is no discharge of heavy ice into the harbour.

The water in the Churchill being shallow there is, consequently, only a light discharge of ice under any circumstances, and its effect on the harbour is not appreciable.

The entrance to the harbour is about 2,000 feet wide, with a minimum depth of water of ten fathoms. Vessels drawing thirty-six feet of water could enter the harbour and anchor within 200 yards of the west shore, to a point 3,500 feet south of

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Fort Prince of Wales. The bay outside the harbour also affords good anchorage; there is ample depth of water.

A vessel drawing twenty-four feet of water can come within 150 yards of the east side of the harbour, from its mouth to a point 150 yards south of Battery beacon. There is also good anchorage south of the point last alluded to (150 yards south of Battery beacon) for 2,000 feet in length by 800 feet in width for vessels drawing twenty-four feet of water. Opposite Battery beacon for a distance of 2,500 feet across the harbour there is a minimum depth of twenty-four feet of water.

From the harbour entrance following the east shore, the bottom consists of sand deposited by eddies, caused by the outrunning tide. From the harbour entrance to a point 150 yards south of Battery beacon and extending into the harbour about 300 yards in width, the bottom might easily be dredged.

Churchill.

Churchill consists of two peninsulas, one on the west being about ten miles by three miles wide at the southern end, and one on the east side about five miles by two miles wide at the southern end. The western peninsula on its western side has two ridges, each from 90 to 125 feet in height; the northern one extending $3\frac{1}{2}$ miles southerly from Fort Prince of Wales, and the southerly one commencing at a point $4\frac{1}{2}$ miles south of Fort Prince of Wales and extending southerly a distance of 11 miles.

These ridges consist of (felspathic-quartzite) sandstone of a green grey colour, well adapted for building purposes. Fort Prince of Wales is built of this stone, and its durability may be gauged by the fact that it has not suffered, although built in 1733.

On the southerly end of the northerly ridge there is a deposit of white quartzite, similar in formation to Marble island; this stone takes a fine finish and is well adapted for ornamental building purposes; an area of about ten acres is exposed. The northerly ridge forms a level plateau, sandy in places, the southerly end being rugged. The southerly ridge is rugged from its northern end until opposite Mosquito point.

From the point of the west peninsula to the Royal Northwest Mounted Police post the terrace is sand and gravel—the balance to Mosquito point is clay and rocky till. Broken limestone is found in large quantities within half a mile southerly of the police post.

From Fort Churchill, for two and one-half miles southerly, the flat averages about one mile in width, and contains fine grazing land.

Fort Prince of Wales.

Fort Prince of Wales is situated at the west side of the entrance of the harbour at Churchill. It occupies a position about twelve feet above high water mark. It is built of sandstone quarried in the vicinity. The fort was commenced in 1733 and was completed in 1747. Joseph Robson was the engineer. The length of each side is 312 feet, three of the sides being of dressed and dimension stone both inside and out. This could be utilized for building purposes. The walls are 34 feet thick and 16 feet high, and were mounted by 40 cannon.

This fort was captured and partially destroyed by the French Admiral La Perouse in 1782.

Royal Northwest Mounted Police Post.

The Royal Northwest Mounted Police erected, in 1906, a post on the beach about 6,000 feet southerly from Fort Prince of Wales—the post consists of six nice lumber buildings.

Fort Churchill.

Fort Churchill was established in 1688 and rebuilt in 1721; it is situated on the beach on the west side of the Churchill river about five miles from its mouth, and is

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the headquarters of the Hudson's Bay company. It has a missionary Episcopal church; the company's stores, etc., comprise about fifteen buildings. Back of this beach, which is 100 to 200 yards in width, rise steep bare rounded hills to a height of 80 and 100 feet.

Eastern Peninsula.

Following the shore from the entrance to the harbour for 150 yards south of Battery beacon there is a rocky ridge from 30 to 45 feet in height of the same formation as the one described on the western peninsula; the stone is also well suited for building purposes. Thence, for two and one-half miles southerly, the ridge takes a bend inland. The flat in some places being three-quarters of a mile in width between the ridge and the shore line.

On the plateau formed by this ridge, between the Battery and Battery beacon, from the harbour to the bay, there are good building sites. About a mile south of Battery beacon the plateau is sandy and, extending from the river to the bay, a distance of 3,000 feet in length by 1,200 feet in width, is also good for building sites. The balance of the plateau is more or less rocky and broken.

About three miles southerly of Battery beacon, and two-thirds of a mile from the river, are three or four fresh water lakes at an elevation of 15 feet above high water. The bottoms of these lakes consist of limestone; they cover an area of about one square mile and would furnish a good water supply.

Between the lakes and the river a good site exists for large railway shops and yards. The flats are formed of clay and rocky till.

From high water mark to a point half a mile in the river the water is only two feet deep—this land is susceptible to reclamation. About two and one-quarter miles from Battery beacon, southerly on the Hudson bay shore, there is a large deposit of limestone of a cream colour. This covers an area of 1,200 to 1,500 feet and extends into the bay as far as low water mark, a distance of about half a mile. This is easy to quarry, and would make good building stone and lime for building purposes.

Although there is no merchantable timber in the vicinity of Churchill, there is abundance of fine building stone and limestone to be found everywhere, and there is also an ample supply of timber for fuel purposes for many years along both banks of the Churchill river and around Button bay.

In September, October and part of November, large shoals of white whales (I counted thirty-five in one shoal) could be seen going up river at every tide. Salmon trout and whitefish are taken in the river and harbour all the year, but are more abundant in the spring.

At Churchill potatoes, turnips and other vegetables have been successfully raised at the Hudson bay fort. For many years cattle and horses have been successfully kept and bred at the Hudson bay post. Excellent butter was also made. Splendid pasture and hay meadows are found on both sides of the river above the harbour for a known distance of thirty-five miles.

At the head of Button bay there is an area of 2,000 acres upon which good hay can be cut, which has been pronounced by Professor Macoun as affording excellent forage. Wild black and red currants and gooseberries are found in great quantities, and are the equal, if not the superior, in flavour of garden produce. Barrels of black currants can be picked around Fort Prince of Wales; cranberries exist in great abundance everywhere. Other berries which are indigenous to the climate abound.

Game and Fur-bearing Animals.

Within a few miles of Fort Churchill, in the fall and winter, large herds of barren land caribou were encountered. These herds supply fresh meat of an excellent quality for the residents of Churchill. Polar bears are occasionally shot in the vicinity. Along the western peninsula Eskimo congregate in the spring for the purpose of seal hunting. The animals frequent these shores in the spring in large numbers.

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Among the fur-bearing animals are found black fox, silver fox, red and white fox, marten and wolves, both black and grey.

Swans, geese, ptarmigan and many species of duck in large numbers, and some spruce grouse are found along the shores of Churchill harbour and river.

Exploration between Churchill and North River.

Between October 24, 1906, and November 9, 1906, I made an exploration of the country between North river and Churchill river for a distance south of Button bay, of about twenty miles. On the east side of Button bay I found a strip of good timber, consisting of spruce and tamarack, six to ten inches in diameter, about half a mile wide and extending three to four miles in length on the east side, between the southern ridge of Churchill peninsula and the bay, and about three miles southerly from Fort Churchill.

At the head of Button bay (and parallel with it) there are a number of parallel ridges extending to North river. These ridges are timbered with spruce and tamarack four to ten inches in diameter. Close to North river there is good spruce timber ten to thirty inches in diameter in small scattered bunches, covering a distance of about four miles.

At the southern end of the south ridge of the western peninsula at Churchill, there is a strip of good spruce timber six to twelve inches in diameter extending about two miles by four miles; also on the east side of the same ridge about one and one-third miles south of Mosquito point, there is a strip of good timber for a distance of about four miles. The balance of the country explored was level and perpetually frozen and open, covered with thick moss and small ponds, with bluffs of scrubby timber occasionally.

Exploration to Owl River.

Between December 7, 1906, and December 17, 1906, I made an exploration of the country between Churchill and Owl river. Four miles from Churchill river in a southerly direction, I crossed a ridge, running in a northeast and southwest direction at about one and one-half miles from Hudson bay, extending opposite to Mosquito point. From the point of crossing to the bay, on the sunny side the ridge is well timbered with spruce six to twelve inches in diameter. Twenty-five miles from the starting point, I crossed another gravel ridge with scrubby timber. Two miles west of this point there is a barren hill known as White mountain, three hundred feet in height by one mile in length. At the eastern woods there are a few square miles of spruce and tamarack averaging six to eight inches in diameter. Close to White Whale lake I crossed another gravel ridge on which there is no timber. On each side of Salmon creek there are scrubs, willows and small spruce, with grassy meadows. At Broad river to the left of the place of crossing, for about four miles there is a strip of timber one-third of a mile in width, eight to fourteen inches in diameter, black spruce, stunted.

The balance of the country is open, level, plain perpetually frozen, covered with thick moss and having many ponds. For one whole day we passed through an immense herd of barren land caribou. There must have been thousands of them.

General description of the country along the route travelled from Fort Churchill to

The Pas.

From station 0, Churchill harbour, the first four miles are through open country, the soil is clay and rocky till, about eight feet above high water. To the east of the proposed route, about three-quarters of a mile from high water mark, there is a sandstone ridge about forty feet high, extending towards Hudson bay for a distance of seven miles.

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From station 4, the country is covered with scrub timber and tamarack for a distance of twenty-eight miles. Small shore ridges averaging six feet in height, are also found along this section. Those ridges are frozen and covered with moss.

At station 52, Deer river was crossed; at that point it is three hundred and fifty feet wide from bank to bank, and the banks are twenty-five feet high.

From station 32 to station 100, the country is a level, open plain. Some timber is seen along Deer and Churchill rivers.

At the end of September, I dug two holes, one on each side of Deer river, twelve miles from its mouth, and at seven feet deep found clay with rocky till; the material gone through was peat, containing about 50% of ice, heavily covered with moss. On this last section there are a few shallow ponds which can be easily avoided. Timber is seen along Churchill and Deer rivers.

From station 100 to station 130, Churchill river, the country is covered with scrub spruce and tamarack from four to six inches in diameter. There are also a few lakes and swamps, and some ridges from ten to fifteen feet high. This last section is about two hundred and fifty feet above Little Churchill river. From station 130 we reached Churchill river about three miles below the mouth of Little Churchill. There is no timber along this part. From that point we travelled on the east side of Little Churchill river to station 200. Along this section there is some timber from six to fourteen inches in diameter. The country is dry, more or less rolling, with a depression of ten to fifteen feet. At a distance from station 200 a ridge is seen in a southwest direction.

At station 200 we crossed again Little Churchill river, thence followed its west side to Washkaïowaka lake. That section is fairly level and dry, with some scrub timber. Washkaïowaka lake is about sixteen miles long, it has two extensions connected by narrows; clayey hills, thirty to forty feet above the lake, were seen on the northern shore of the northern part of this lake. The banks are steep and covered with very thick mossy peat, probably ten feet thick. The timber consists of black spruce and white birch from five to sixteen inches in diameter. At station 240 we crossed the same ridge seen at station 195. This ridge is 200 feet high, and runs a few degrees south of west. It is thickly timbered with spruce four to ten inches in diameter. From station 240 to station 250 on Split lake, Hudson's Bay post, the country is generally low and swampy. Travelling over three lakes, we found their shores well wooded with spruce, tamarack and birch. From Hudson's Bay Company's post to the mouth of Grass river, station 280, the country on the east side of the lake is undulating; part of the banks and islands are fairly timbered with spruce.

From the mouth of Grass river to station 294, on the east side of the river, there is no timber of commercial value. The country is more or less swampy.

From station 294 to station 310 we reached Burntwood river, which is about 450 feet wide at that point. The banks are about twenty feet high, showing granite in some places on either side. The country is hilly, with swamps and scrub timber.

From station 310 to station 355, on Grass river, the country travelled through is very much like the last described section.

From station 335 to station 364, Landing lake, the country travelled through is covered with scrub timber, with the exception of a few bunches of good timber here and there. Part of the shore of Landing lake and the islands are well timbered with spruce six to ten inches in diameter. Travelling from Landing lake to the head of Sipiwek lake, the country was found dry and well timbered with spruce from eight to fourteen inches in diameter. About half way on this section we crossed a ridge about eighty feet high, on which we noticed Mr. Bayne's old exploration line. From station 364 to station 400 the islands of Sipiwek lake are well timbered with spruce, some being thirty inches in diameter.

From station 400 to station 412, Nelson river, the country travelled through is hilly, dry and covered with scrub timber.

From station 412, H. B. post, on Cross lake, there was no timber of commercial value seen on the islands.

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From station 422 to 436, Duck lake, the islands or portages were covered with scattered spruce trees.

From station 436 to station 460, Setting lake, the country is level and dry, covered with spruce four to six inches in diameter, and some ridges fifteen to twenty feet high, running parallel in a northeast and southwest direction. At station 438 we crossed Mr. Bayne's old exploration line.

From station 460 to station 480 we followed the west shore of lakes, and Grass river. The country is good, dry and undulating.

From station 480 to station 500 the country is dry and level, covered with scrub timber. From station 500 to 520 we struck Grass river. The country on this section is rough, and is covered with hills and ridges, some 150 feet high, running in a northeast and southwest direction. No timber of any commercial value was seen around.

From station 520 to station 558 we followed Grass river, Wekusko lake and Reed lake. The country travelled is rough and hilly.

On Reed lake the islands are well timbered with spruce six to fourteen inches in diameter.

From Reed lake to station 616 the country is level, 40 per cent being swampy. There is some spruce and tamarack timber four to eight inches in diameter.

From station 616, on the north side of Cormorant lake, there is a strip of timber, four miles wide by ten miles long. This timber is the best seen while exploring around that country.

From Cormorant lake to The Pas the country is undulating, without any timber of commercial value.

The total mileage of the route explored is 690 miles.

From the above exploration I made of the country, a good railway can be built at reasonable cost almost anywhere close by my proposed location. What is absolutely necessary is good drainage, the country having so little slope, the closer one follows the rivers the cheaper the drainage of the line will be.

The proposed route shown on the accompanying map seems to me the best location for a railway in that part of the country.

A railway from The Pas on the Saskatchewan to Churchill on Hudson bay, would be of the greatest commercial advantage for the people of the west and northwest for the following reasons:

The average saving in rail transportation, for Manitoba, Saskatchewan and Alberta, via Churchill, as against Montreal to Liverpool would be 970 miles.

The distance from Churchill to Liverpool is 2,940 miles. From Montreal via Belle Isle, 2,761 miles. From Montreal via Cape Race, 2,927 miles, from New York 3,079 miles.

The freight upon grain from the wheat belt to Hudson bay would approximate ten cents a bushel, the same as to Port Arthur—the additional fifteen cents from there to the Atlantic seaboard would be saved to the farmer, and this of itself represents a fair profit to the wheat grower. Assuming an export trade of 20,000,000 of bushels, which can easily be handled in two months of the season by the proposed railway, the saving of fifteen cents a bushel being the difference in cost of freight from Port Arthur to the Atlantic seaboard would amount to \$3,000,000.

A very important feature in connection with a railway which secures quick access to the sea, is with relation to the shipping of cattle to the European markets; this great industry is at present seriously handicapped in consequence of the long journey to be endured under present conditions. It is admitted as a well recognized fact, that cattle shipped to the Atlantic coast arrive at the shipping port in poor condition, emaciated by long days of rail travel. It is also admitted that on the sea journey they gain rather than lose in flesh, if put on board in good condition. Experience proves that after three days of rail travel cattle will deteriorate; that three days is about the limit of the time during which they can travel and maintain the condition in which they are placed on board. This being so, cattle could be transported to Fort Churchill

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without loss in flesh, and the voyage to Liverpool would improve this condition rather than the country. Therefore this great industry alone would find in the Fort Churchill route a solution of the difficulty under which those engaged in the business of cattle shipping now labour.

Mr. F. W. Peters, assistant freight traffic manager of the Canadian Pacific at Winnipeg, states that up to the end of October over 72,000 head of cattle had been shipped to Liverpool from western Canada, and he expected a further 10,000 head to be shipped that season. The freight rate on these cattle would be about sixty cents a hundred pounds in car lots from Winnipeg to Montreal. The rate from Calgary to Fort Churchill would be about the same as to Winnipeg, and the distance about equal, so that this sixty cents a hundred pounds could be saved to the shipper if he could put the cattle on board at Hudson bay, and he would also prevent the shrinkage which would otherwise occur, by reason of the additional rail journey from Winnipeg to Montreal.

Upon the 82,000 head of cattle shipped to Montreal from the west during the past season, the saving in freight alone would be \$6 a head, or, in round figures, \$650,000, equal to about 20% of the selling price.

Pulp Wood.

All the timber between the head of Little Churchill river and Churchill is reserved for fuel purposes. The pulp wood belt as estimated below begins at Split lake and extends to The Pas, ten miles in width on each side of the way proposed for the route of the Hudson Bay railway. On this area, assuming one-sixth to be covered by pulp wood, the balance being river, lakes, ponds, swamps, etc., and assuming ten cords per acre of an average of six inches in diameter, there would be 5,756,660 cords. This is a very low, but safe estimate.

Water Powers.

Deer river, at its mouth, has a minimum flow of 70,000 cubic feet per minute. A dam eighteen feet high can be built at reasonable cost and would generate 1,600 horse power. Two dams of the same height could be built within ten miles of the river mouth, which is twenty-five miles from Churchill.

North river, which is three hundred and fifty feet wide during December, had a flow of not less than 250,000 cubic feet per minute. This could be dammed for fifteen feet high and would generate about 5,000 horse power.

On Churchill river, within sixty and eighty miles from Churchill, large water power could be developed and transmitted to Churchill.

Nelson river, Burntwood river and Grass river, have a number of falls which could be utilized for the development of power for use in pulp mills or other industries.

Coal and Minerals.

Notwithstanding that a most searching examination was made I failed to find any coal cropping or indications.

As to minerals, the best specimens of rock which I found at Churchill and surroundings, were assayed at the Geological Department, and contained only magnetic iron; no traces of precious metals were found. In the surroundings of Wekusko lake are many exposures of rock of Huronian formation, and this being mineral formation, should precious metals exist, the country would be an easy one in which to prospect.

Game and Fish.

From timber line on Hudson bay to The Pas are found moose and caribou in fair quantities. Rabbits are scarce throughout the country explored. We saw a

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few spruce grouse; ptarmigan are found plentifully, but not farther south than Grass river.

Fish.

Whitefish abound in all the lakes from Churchill to The Pas; also in some lakes are found trout, pike and sucker. Indians and travellers rely upon this source of supply for dog feed.

Swamps and Marsh.

About 35 per cent of the country travelled through is marshy and swampy; more or less hay is grown. Under marshes or swamps the soil is generally clay.

Farming Land.

I have no doubt that when the swamps and marshes are drained and moss stripped they will be susceptible to farming operations between Churchill and The Pas, and at a later period, after the Northwest is settled, this land will become valuable.

From September to January at Churchill.

September was very windy, rather cold and a few days of rain; October splendid weather, bright and clear; November some snow and rather windy; December colder and more snow. The coldest day was 38 degrees below zero. The accompanying schedule shows temperature.

I have the honour to be, sir,
Your obedient servant,

W. THIBAudeau, C.E.

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25b	1907.		Place.	Aneroid at 7 p.m.	Tempera- ture at 7 p.m.	Wind.	THERMOMETER.		Remarks.
	Month.	Day.					Minimum.	Maximum.	
January	January	1	Fort Churchill.	30.67		S.	0.00		Barometer at R.N.W.M.P. post at 10 a.m. B=30.67, at 10
"	"	2	R. N. W. M. P. Post						a.m. depth of snow 16 inches.
"	"	3	Mosquito Point	29.76	5.00	S.E.	5.00		1 mile above Mosquito Point, tide water.
"	"	3	"	758 m.m.					
"	"	3	"	29.76					
"	"	4	"	29.70					
"	"	4	"	757 m.m.	10.00	N.W.	0.00		
"	"	4	"	29.75					
"	"	5	Churchill River	30.09					On the middle of river amongst a bunch of islands opposite
"	"	5	"	763 m.m.	-20.00	Calm.	-20.00		mouth of Deer River.
"	"	5	"	30.26					
"	"	5	"	30.14					
"	"	6	"	765 m.m.	1.00	S.W.	0.00		" " some snow.
"	"	6	"	30.35					
"	"	7	On small creek	30.33	2.00	W.	0.00		10 feet above Deer River.
"	"	7	"	768					3 miles from its mouth.
"	"	7	Deer River	30.07					
"	"	8	"	762 m.m.	2.00	S.W.	-3.00		30 ft. above Deer River and about 30 miles from its mouth.
"	"	8	"	29.18					
"	"	9	"	29.19	2.00	Calm.	-8.00		About 35 ft. above Deer River and 55 miles from its mouth.
"	"	9	"	742 m.m.					
"	"	9	Head of Deer River	29.06					Snow 16 to 20 inches deep, head of Deer River.
"	"	10	"	737 m.m.	7.00	Calm.	-8.00		
"	"	10	"	29.02					3 miles below mouth of Little Churchill River and 124 ft.
"	"	10	Churchill River	29.44					above river.
"	"	11	"	746 m.m.	-1.00	N.W.	-2.00		Snow 16 to 18 inches deep.
"	"	11	Little Churchill River	29.72					25 miles up Little Churchill River.
"	"	12	"	754 m.m.	-7.00	S.W.	-10.00		10 ft. above river.
"	"	12	"	29.82	-10.00	W.	-14.00		At Putnon Indian camp.
"	"	13	"	29.95	-10.00		-18.00		" "
"	"	14	Waskatowaka Lake	29.72					Banks 16 ft. high.
"	"	15	"	29.75	0.00	Calm.	-6.00		
"	"	15	"	751 m.m.					
"	"	16	Towards Split Lake	29.64					Snow 20 inches deep.
"	"	16	"	29.67	-10.00	S.W.	-10.00		
"	"	16	"	750 m.m.					
"	"	17	15 miles from Split Lake.	29.36					At Indian fishing camp.
"	"	17	Split Lake	29.36	-2.00	S.W.	-5.00		
"	"	17	"	744 m.m.					

1907.		Place.	Aneroid at 7 p.m.	Tempera- ture at 7 p.m.	Wind.	THERMOMETER.		Remarks.
Month.	Day.					Minimum.	Maxim'm.	
January	18	Split Lake.....	29.46	-25.00	S.W.	-10.00		Snow 24 to 26 inches deep, 14 feet above lake.
"	18	".....	747 m.m.					
"	19	".....	29.60					
"	19	".....	751 m.m.	-28.00	S.	-39.00		
"	19	".....	29.66					" " "
"	20	".....		-32.00	Calm.	-48.00		
"	21	Churchill River.....	29.98					1st rapid, 30 ft. above 1st rapid.
"	21	".....	749 m.m.	-28.00	S.	-42.00		8 ft. above Grass River and 15 miles from its mouth.
"	22	Grass River.....	29.96					About 35 ft. above river.
"	22	".....	761 m.m.	-28.00	S.W.	-38.00		
"	22	".....	30.12					
"	23	Natawanan.....	29.55		S.	-42.00		
"	23	Grass River.....	749 m.m.	-28.00				
"	24	".....	29.75					" "
"	24	".....	753 m.m.	-4.00	Calm.	-9.00		
"	24	".....	29.85					
"	25	".....	29.47					
"	25	".....	748 m.m.	-14.00	S.	-28.00		
"	25	".....	29.55					
"	25	".....	29.51					
"	26	".....	747 m.m.	-14.00	S.	-18.00		Compon, a portage about 20 ft. above river.
"	26	".....	29.52					
"	27	Nelson River.....	29.65	-35.00	S.W.	-38.00		Snow 3 ft. deep.
"	27	".....	747 m.m.					Head of Nelson and Sipiweak lakes.
"	27	".....	29.72					8 ft. above.
"	28	".....	29.69					On an island, snow 3½ ft. deep, 7 ft. above Sipiweak Lake
"	28	".....	748 m.m.	-34.00	S.W.	-42.00		
"	28	".....	29.80					Portage between Sipiweak Lake and Grass Lake.
"	29	Sipiweak Lake.....	29.72					
"	29	".....	29.75	-34.00	S.W.	-38.00		
"	29	".....	752 m.m.					
"	30	Cross Lake.....	29.55	-34.00	S.W.	-38.00		Hudson's Bay company's post, 14 ft. above lake.
"	30	".....	756 m.m.					
"	30	".....	29.56					
"	31	".....	29.46					" "
"	31	".....	747 m.m.	-28.00	S.W.	-40.00		" "
"	31	".....	29.43					" "
"	31	".....	29.68					McLeod's place.
February	1	".....	754 m.m.	-20.00	S.W.	-24.00		14 ft. above lake.
"	1	".....						" "
"	1	".....	29.80					" "

"	20.75	"	30.00	S.W.	-42.00		
"	755 m.m.	"					
"	29.80	"					
"	29.47	"					
"	749 m.m.	"	-18.00	Calm.	-38.00	"	
"	29.54	"					
West of Cross Lake.....	29.46	"	-12.00	S.W.	-7.00	Depth of snow, 3 ft., 35 ft. above river.	
"	747 m.m.	"					
"	29.54	"					
Duck Lake.....	29.66	"	-16.00	W.N.W.	-20.00	7 miles west of lake.	
"	751	"					
"	29.67	"					
Grass River.....	29.56	"	-16.00	W.	-49.00	5 ft. above.	
"	751 m.m.	"					
"	29.59	"					
1 mile from mouth of Grass River.	29.33	"				Snow 2½ ft. deep.	
"	742 m.m.	"	-12.00	Calm.	-16.00	"	
"	29.34	"				"	
North of Wekusko Lake.	29.20	"	0.00	W.	-10.00	Snow 3 ft. deep, 30 ft. above.	
"	736 m.m.	"					
"	29.20	"					
"	29.24	"					
"	742 m.m.	"	0.00	Calm.	-15.00	"	
"	29.29	"					
End of Railway line....	29.42	"	-28.00	S.W.	-30.00	Grass River, 15 ft. above.	
"	745 m.m.	"					
"	29.45	"					
Reed Lake.....	29.10	"	-5.00	S.W.	-10.00	6 ft. above.	
"	736 m.m.	"					
"	29.12	"					
Railway line.....	28.73	"	34.00	S.W.	28.00	16 miles from Cormorant lake.	
"	729 m.m.	"					
"	28.73	"					
"	29.27	"				On a small creek.	
"	740 m.m.	"	5.00	S.W.	3.00		
"	29.26	"					
Cormorant Lake.....	28.87	"	5.00	Calm.	-5.00	At the Narrows, 8 ft. above lake.	
"	731 m.m.	"	5.00	"		"	
"	28.85	"				"	
Atikameg Lake.....	29.12	"				South end, 6 ft. above.	
"	737 m.m.	"	30.00	Calm.	20.00	"	
"	29.12	"				"	
The Pass.....	28.86	"	2.00	Calm.	5.00	At McLeod's, 12 ft above high water.	
"	733 m.m.	"					
"	28.87	"					

APPENDIX No. 44.

REPORT OF J. N. WALLACE, D.L.S.

SURVEY OF BLOCK OUTLINES IN NORTHERN SASKATCHEWAN.

CALGARY, ALBERTA, May 11, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on the survey of the fourteenth base line, from the third to the second meridian and of part of the second meridian, undertaken in accordance with your instructions of May 1, 1906:—

I left Calgary on May 8, and after a few days spent at Edmonton, where I purchased the pack outfit and some of the horses, I left for Prince Albert and reached there on May 14. Here, owing to very rainy weather and the difficulty of getting the required number of pack horses, I was delayed for over a week.

Pack horses are hardly known as a means for transportation at Prince Albert, and it was a difficult matter, therefore, to get the right class of horses. Several of the horses I was compelled to take were too big, and caused serious delay subsequently on account of their inability to carry a pack load across swampy ground.

We left Prince Albert on May 21 and reached the northeast corner of township 52, on the third meridian, where I was to commence work, on the evening of the next day. From this date until June 1 the time was occupied in retracing that part of the fourteenth base line already run, a distance of twelve and three-quarter miles across the fractional range 28 and ranges 27 and 26.

The base line was continued as an original line easterly from the east side of range 26, and good progress was made up till September 7, when we reached Saskatchewan river at the east side of range 13, having completed ninety-one miles of line in a total of ninety-two days, excluding Sundays only.

The greater part of the district through which the line had already been run lay between the third meridian and the middle of range 23, where the road to Candle lake crosses the line. There is a great deal of first-class land in this area. Between Candle lake road and Saskatchewan river the line passes through a very mixed country. There are many good areas and many very large swamps. The soil is very sandy near the crossing of Torch river.

The Hudson's Bay company had sent a scow down Saskatchewan river in August with supplies and oats from Prince Albert and cached them on Birch island, the cache fortunately coming within a hundred yards of the line. These supplies were supposed to be sufficient to take me to Pas mountain.

Subsequent to the reaching of the river the work was seriously delayed by many causes, so much so that the average rate of progress of the last half of the work was only about half the rate of the former half.

After leaving Saskatchewan river the base line passes through a lightly timbered country for a few miles, when it meets the first of those muskegs which were to prove so disastrous to transportation during the following two months. This first muskeg begins two miles east of the township corner, between ranges 12 and 11, and extends about two miles and a-half along this range. After a vain endeavour to get round it, and finding the country north and south to be worse the farther from the line we went, we finally decided to take the horses right across the bog land, which was accomplished after much trouble.

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For about six miles after this, in the neighbourhood of Petaigan river, the country is much better. Although it is thickly timbered and there are local swamps, there are some large areas of first-class land. At the end of this six miles and about four miles east of the township corner, between ranges 12 and 10, we came upon an area of muskeg, swamp and slough land, which extends continuously along the line to the crossing of Carrot river, in range 4, a total distance of twenty-nine miles.

From September 25, when we met the first of the wet lands, until November 15, when the ground became frozen hard, transportation was one continuous struggle. Open bog land or swamps, with scattered stunted tamarack and spruce, stretched for miles in all directions, and in many instances the only way to get the horses across was by constructing a causeway made of small spruce trees. For this purpose trees fifteen to twenty feet high were cut down and laid lengthwise in bundles on the surface of the bogs in a regular manner, so that the stems of each bundle were covered by the brush tops of the succeeding one. In this way we constructed an aggregate of several miles of roadway, cutting down thousands of trees for the purpose, and working day after day in water from six inches to a foot in depth.

The previous June a large amount of supplies had been sent out for me by the Hudson's Bay company at Prince Albert to their post at Pas mountain. These went down Saskatchewan river and Sipanok channel and then up Carrot river. The position of this post was shown on all maps to be at the middle of range 4.

As time went on and the supplies in camp became lower, and the general aspect of the country showed no signs of improvement, I became anxious to get in touch with Pas mountain. I was in the unfortunate position of having all the oats back at Birch island and the supply depot ahead at Pas mountain. If I persisted in going on the horses, which were daily getting weaker for want of feed, would finally play out altogether, and if I went back to where the oats were and waited for the muskegs to freeze over before continuing the line, I would have run out of supplies long before I could have got the line up to range 4, where I believed the H. B. post was. Moreover, I would have had no hay for the horses.

We had already sent back for some of the oats, but the absence of the horses on a trip back over the swamp land was so prolonged that the work was seriously handicapped by our inability to move camp, and great delay was caused thereby.

The chief trouble lay in the fact that there was no one in the party who had the least idea where Pas mountain was. The general appearance of the country was such as to inspire little hope that any one would be able to travel the necessary twenty-three miles ahead and find where the post was, and it seemed still less likely that they would be able to get any supplies back even if the post were found.

While in this dilemma it was a relief on November 12, to meet with a chance Indian hunter, the first stranger we had seen for eight weeks, and to learn from him that Pas mountain was only six miles away. Such indeed proved to be the case, the post being shown on the maps seventeen miles too far east.

Meanwhile the line had been slowly advancing and was now at the east end of range 8, about two days out of three being occupied in fixing pack trails and moving camp. Five of the horses had already died and the remainder were rapidly failing. The supplies and oats I had ordered from Fort a la Corne could not arrive until the middle or end of December, when the muskegs would be frozen over. There was no recourse, therefore, but to send the horses back to Birch island.

While the slough land was sufficiently frozen to carry horses on November 18, the tamarack bogs were not, until December 1.

On November 27, the base line was surveyed up to the middle of range 6, and a tie line of over three miles had been run to Indian reserve No. 29a. I then moved camp six miles ahead of the work and despatched the horses back to Birch island on a round trip of one hundred miles, sufficient hay for at least part of the journey having to be packed on the horses in sacks. The men returned to camp on December 11, after a severe journey, the temperature now being frequently as low as forty

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degrees below zero. They could bring back only enough oats to last three weeks, but the horses had been well fed since December 4, the date on which they reached the oats at Birch island, which was the important thing.

On December 20, three teams from Fort a la Corne reached Pas mountain with oats and supplies. They had a hard journey, having no regular road and having had to break trail in the deep snow for nearly the whole of the hundred miles from La Corne.

The freighters brought out your letter of December 5 in reference to the necessity of completing the work, and I considered it well to engage one of them to come back from La Corne with some more oats about the end of January, and to then help us with the transportation till we ended the work. This arrangement had a material effect in enabling me to complete the survey.

On December 21, after nearly forty miles of muskeg and slough land, we reached the crossing at Carrot river in the middle of range 4, which was the end of the wet lands.

Nothing in the way of settlement can take place along ranges 7, 6, 5 and 4 until drainage on a very large scale is carried out. Both Carrot river and Sipanok channel should afford a good basis for such a system when the progress of settlement is such as to justify large expenditures in the less favoured areas. These lands, it should be remembered, are not bogs or muskegs like the lands in ranges 8, 9, 10 and 11, but consist of flooded slough land with long reeds and grass.

With regard to the muskegs it has been stated that railway engineers, in sounding along the new line from Etoimami to The Pas, found the average depth of bog to be only four feet with a substratum of hardpan, and the greatest depth found was nine feet. The explanation of the bog would then be that the water could not drain downwards, and in these northern latitudes did not evaporate, and in the course of ages the depressions silted up. There may be some ground for the idea, that the order in course of time is bog land, tamarack swamp and then spruce swamp, the lands gradually silting up and vegetation growing at an increasing rate as the land becomes drier. I think, however, that many bogs are much deeper than nine feet.

East of the crossing of Carrot river the country is thickly timbered. At the east end of range 4, the foot of Pasquia hills was reached. The ascent up these hills continued over an exceedingly rough, broken country, composed of ravines, cutbanks, and hills, covered with timber. The snow got deeper and the work more fatiguing every day until, on January 29 we at last reached the summit at the middle of range 2, with the snow at least three feet deep and the temperature anything from thirty to forty-five degrees below zero.

The highest point reached on the line is fourteen hundred feet above Carrot river, but the hills farther south reach some two hundred feet higher.

We had been through some hard work in the muskegs between Saskatchewan river and Pas mountain, but the experience of getting the line over these hills, or rather mountains, put all else in the shade. Not only had we the deep snow and rough country, but being on the northerly slope of the mountains we were exposed to the bitter winds coming in over the vast open areas to the north. We received, moreover, little benefit from the sun, as it seldom rose, so far as the valleys are concerned, until ten o'clock and set about half-past one or two.

From the centre of range 2, the hills descend rapidly to the east, their foot being about two miles west of the second meridian.

On February 19 we closed on the second meridian. The total deficiency in one hundred and sixty-three miles was four chains and two links (265 feet) in distance, and the line struck two chains and forty links (160 feet) south of the iron post planted in 1901, which was the theoretic end of the base line.

From the summit of Pasquia hills, on the base line, an extensive view is obtained. Theoretically the horizon is some forty-five miles distant. To the northeast the country is apparently as level as the sea. By far the greater proportion appears to

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be composed of open slough land, bog land or lakes. For a few miles east and west of the second meridian the greater part is covered by bush of some kind, but looking to the northeast and northwest only a small fraction of the area is other than land more or less flooded.

Surveying in that area in winter will always be a severe operation on account of the deep snow and intense cold, but it would appear to be an impossibility to survey it at any other season. I may say that the satisfactory marking of the corners in such an area is a most difficult question to decide.

On February 22 we moved camp northeasterly nine miles to the north of township 53 on the second meridian from which point I was to continue on this meridian. The freighter whom I had engaged to come out from Fort a la Corne at the beginning of the month had, during the previous two weeks, been hauling hay, oats and supplies some thirty-five miles from Shoal lake to this point.

On the same date I opened up the last mile of the second meridian previously surveyed, and had the far too common experience of finding that the iron post, which should have been at the township corner, was not there. I therefore retraced the last two miles and planted a new iron post at the north of township 53.

The meridian was run north for sixteen and a half miles when we came to Saskatchewan river, where I had been instructed to end. On the southerly bank I planted a temporary iron post marked 'II Mer.' It is twenty-nine chains north of the southeast corner of section 25, township 56. An approximate connection was made with the traverse of the river made by Mr. Klotz, D.T.S., in 1884, and on the evening of March 12, a pretty well tired out survey party made their way back to camp, through the deep snow, for the last time.

Next day we commenced the homeward journey of two hundred miles to Prince Albert travelling back along the meridian to Carrot river and up this river and Sipanok channel and so to Shoal lake and then to Red Earth (Pas mountain).

From Red Earth, we had a journey across country of nearly one hundred miles to Fort a la Corne, which place we reached on March 22, and finally reached Prince Albert on March 25, after an absence of ten months. The party were paid off the same day, and I reached Calgary myself on March 30.

In all, one hundred and eighty-three miles were surveyed of which a total of fourteen and a half were retracement.

The lands along the base line and meridian are described in detail in attached separate report.

As regards the summer climate I should consider it very good for agriculture. There is abundance of rain. The only summer frost occurred on the nights of August 22, 25 and 30 when ice as thin as paper was formed. The minimum temperature was 28°. The first snow to remain, fell on November 2. The first frost of any consequence occurred about November 15. On November 29 the temperature dropped suddenly to 5° below zero and on December 7 to 41° below. During December, January and the first of February the cold was steady and intense, not abating, even for a day. It was considered an exceptionally severe winter all over the Northwest, but it is always severe near Cumberland House and The Pas.

The hottest day of the season was August 13, with a temperature of 92° in the shade.

As the matter of transportation is becoming every year a greater strain on the resources of the survey, a few general remarks on the comparative value of horses and dogs in winter transportation may not be out of place.

A team of dogs consists of four as a rule, harnessed one in front of the other, but in the country near The Pas the team consists of five, as the dogs of that country are small. A dog's ration is two or three fish given to him once a day, in the evening. Each fish weighs about two and a half pounds on the average, so that each dog consumes about seven pounds of fish a day. For a team of five dogs this amounts to thirty-five pounds. The team will draw as much as four hundred pounds.

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On the other hand ponies can be kept on ten pounds of oats and twenty-five pounds of hay. Last winter I fed the ponies only seven pounds of oats daily and about twenty-five pounds of hay per head, and they came through in good condition. The only protection they had was a double pack blanket sewn under a heavy canvas pack cover. They never had a tent, rather because I hadn't one, than because I did not think it worth carrying. Each pony carried up to five hundred and fifty pounds. We used flat sleighs, fourteen feet long and twenty-four inches wide, although a width of only twenty or twenty-two inches is better.

We have then the general conclusion that a dog team will haul four hundred pounds with a daily consumption of thirty-five pounds of feed, and that a pony will haul five hundred and fifty pounds when supplied with practically the same weight of feed. Unless, therefore, the greater distance-covering power of the dog team can be utilized, its advantage over a pony is not apparent.

When working in a bush country, a survey camp can seldom be moved more than six miles at a time, and not more than twice a week. For such short heavy hauls with bulky freight, such as tents, rolls of blankets, cook outfit, etc., unsuited to a light dog sleigh, the pony is certainly ahead of the dog team; while for bringing in compact heavy freight, such as supplies or oats to camp from a far-off base, a dog team is more satisfactory. Moreover, the dog's power to cover a much greater distance than a pony, enables a surveyor to keep the dogs at the base of supplies and have them only visit his camp periodically with supplies. He is therefore relieved of the necessity of having to haul fish for the dogs' use while in camp between trips.

The disadvantage of the pony, as compared with the dog team, is his slower pace and the bulk of his hay. Of course, there are often other considerations which in a practical instance would be the determining factor in deciding which of the two means to use. In some regions fish are plentiful and hay impossible to obtain. In others the reverse is the case. Fish are not so easily obtained as is generally supposed.

If a surveyor is notified in time that he is to work during the winter in a certain district, he can frequently arrange to have hay put up for him during the previous summer not very far from his district. This will, of course, generally be slough hay, and many ponies have to be first trained to eat this. The greatest distance I had to haul hay last winter to camp was fifty miles.

An experienced man can pack four hundred pounds of hay, or even more, on a flat sleigh. In loading hay the side ropes are laid out on the ground and a wagon cover laid down on top of the sleigh. The hay is carefully loaded on, keeping it in long rolls as it is drawn from the stack. The canvas is then turned up over the sides and the whole is roped down until almost as hard as baled hay. A pony can thus haul enough hay to last himself at least sixteen days. This was the actual rate at which hay was supplied to the ponies last winter. I may say a very great deal depends on the man who has charge of the ponies. It is almost impossible to get some men to serve exact rations of hay and oats.

There cannot be very much difference in the daily cost of feeding dogs or ponies. The fish necessary for a dog team will cost about fifty cents a day delivered within a few miles of where they are caught. In the regions where base lines are now being run oats will cost about one dollar and a-half a bushel delivered, and hay should not run over a cent a pound at the outside if put up in the district. This would make the total cost of the pony's feed about seventy-five cents a day. As he carries nearly half as much again as the dog team, the cost works out practically the same. For exploration work, or for bringing supplies or oats periodically to camp, a dog team is ahead of a pony. In general, a long, quick journey with a compact load, especially if the snow is deep and the country open, is the ideal condition for using a dog team. For slow, heavy freighting in the bush, such as occurs in working along a base line, a pony will generally be best, even if oats are expensive and hay bulky. I believe the combination of the two methods indicated above will often be found to work out satisfactorily.

I wish to record the manner in which Mr. F. W. Rice, my assistant, stood the many trying days of the winter. He had perhaps the hardest task in the outfit in

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managing the transit work, and that we were able to complete the survey was due in a large measure to his power of endurance.

I have the honour to be, sir,
Your obedient servant,

J. N. WALLACE, D.L.S.

APPENDIX No. 45.

REPORT OF ARTHUR O. WHEELER, D.L.S.

PHOTO-TOPOGRAPHICAL SURVEY OF THE ROCKY MOUNTAINS.

CALGARY, Alberta, November 26, 1906.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—The party left Calgary for the field of operations on June 10. With one assistant, the writer stopped at Banff to take some views from Sulphur mountain, for the purpose of ascertaining the speed of the plates to be used during the survey; and then returned to Calgary to develop these test plates. The remainder of the party gathered at Laggan, to which point the pack horses and survey outfit had been sent two days before.

Ptarmigan Lake Country.

A short distance northeast from Laggan, on the Canadian Pacific railway, lie some beautiful alpine valleys dotted with small lakes and enclosed by strikingly bold snow-clad peaks. This region, situated chiefly in townships 29 and 30, range 15, west of the fifth meridian, has begun to attract the attention of the tourist; so much so, that in 1905 the railway company put in a well-graded pony trail to accommodate visitors to the mountains staying at Lake Louise chalet. As previous surveys had not embraced this particular locality, a camp was taken near the summit of the watershed between Bow and Red Deer rivers, and later a second camp was established on the headwaters of Red Deer river. In all, ten peaks were climbed in the vicinity and twenty camera stations occupied furnishing full information for mapping. Work here was closed on July 4.

At this high altitude, the spring had barely set in and snow was still lying plentifully on the passes and the lakes were clad with ice. It snowed every other day, thereby much retarding the work. The lake near the summit of the pass from the Bow valley, forming one of the extreme sources of Red Deer river, is locally called Ptarmigan lake. It is well named, for round its shores, in all the adjacent valleys and on the alpine slopes above the timber-line flocks of this most interesting species of the grouse family (*lagopus leucurus*) abound. They are a very valuable feature of the bird life of the Rocky Mountains park, and should be rigorously protected; more particularly the robbing of their nests should be punished. Through the main valleys connecting with the headwaters of Red Deer river are deeply worn ruts made years ago by large herds of buffalo passing to and from Bow, Red Deer and Saskatchewan rivers, showing that these sheltered valleys were their favourite wintering grounds.

Two exceptionally fine peaks, Mts. Douglas and Drummond, named after noted naturalists, rear their massive forms on opposite sides of Red Deer river. In their

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vicinity are a number of most charmingly picturesque lakes. The larger valleys of the district present rolling park lands and open pine woods, and furnish a paradise for botanists and those desiring to camp amidst beautiful mountain scenery. As a tourist resort, the locality may be recorded as one of the most attractive of the entire Rocky Mountains park.

Alpine Club of Canada.

In March of the current year the Alpine Club of Canada was organized at Winnipeg. It was based upon the principle that it should be a national institution and that its first object should be to interest the people of Canada in their own mountain regions. To this end, it was decided to hold a first annual camp at the summit of Yoho pass, in the Yoho National park, from the 9th to the 16th of July, with accommodation for one hundred persons.

At this early stage of the club such an undertaking would have been impossible but for assistance rendered from three special sources, viz.: From the Dominion Government by contributing the services of the writer's survey party, from the Government of Alberta and private persons by money contributions, and from a number of the mountain outfitters, who contributed men, horses and outfits, free of charge, to make this first camp a success. And a success it was. One hundred and twelve persons were present, among whom were representatives from England, the United States and South Africa and from numerous points throughout the length and breadth of Canada. No spot in the entire system of Canada's mountain splendours could have been found where more diverse and representative features are presented and the immediate result of that camp has been to bring the club's membership, within its first year, up to one hundred and sixty-five, with an enthusiastic demand for a repetition of the camp for next year, when the attendance promises to be much larger.

The survey party was engaged with this camp until July 18.

Amiskwi Valley and Otto Creek.

To the west of the President's range lies the valley of Amiskwi river leading over a watershed, shown on a previous explorer's map as 'Baker pass,' to Blaeberry river, and thus to the headwaters of the Saskatchewan, via the old Howse pass. About half-way between Kicking Horse river, into which the Amiskwi flows, and Baker pass, a tributary enters the latter stream from the northwest. By following the tributary to its source a pass is arrived at which likewise leads to Blaeberry river. They have been named, respectfully, Otto creek and Otto pass.

This depression cuts into the eastern edge of Van Horne range on a course parallel to its direction, and from July 20 until August 2, the party was engaged in gathering such topographical information as could be reached from it. Seven peaks were climbed and thirteen camera stations occupied. Two additional climbs were made in the Amiskwi valley and four camera stations occupied to supplement information obtained the previous season, but found inadequate owing to smoke from bush fires. During the dates above mentioned frequent showers occurred and some hail and snow fell, but not sufficient to interfere materially with the work. Both the Amiskwi and Otto creek valleys are densely timbered. Much of the timber, chiefly spruce, is of merchantable value and lies within the timber limits of the Palliser Mills company.

Valley of Otterhead River.

Van Horne range was next entered by way of Otterhead river. An old lumber road extends for about two miles up the stream, but from that point on a pony trail had to be cut out clear to the head of the valley, a distance of about nine miles through thick timber. About halfway the stream forks, a tributary coming in from the northeast. The westerly or main stream was followed to the pass at the head of the valley, which leads across a glacier to a valley discharging its waters into Blueberry river. On

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the west side of the pass stands a flat rock mass, which, seen from the direction of the valley, has a very striking appearance, rising into the air like a huge spike. Directly to the south of it an easy pass gives access to a large valley with many tributaries, all sending glacier fed torrents to feed Glenogle creek, which joins Kicking Horse river near Glenogle station on the railway.

The work was carried for some distance down on the Blaeberry side of the pass, and also into the Glenogle creek valley as far as it was possible to extend it. On the 20th the ascent of Mt. Deville was commenced, but a heavy fall of snow forced a return, and as this early snowfall entirely changed the character of the landscape for several days, the party was compelled to move on.

Altogether, between the 5th and 21st August, nine peaks were ascended and sixteen camera stations occupied. Throughout this period of the work smoke from bush fires was a highly detrimental factor. The valley is in parts heavily timbered with good merchantable spruce, but is understood to be already under license.

Moose Creek Valley.

Work was now transferred to the south side of Kicking Horse river, and a move made up the Beaverfoot as far as Ice river. A peak was climbed close to the Shining Beauty mine on the north side of the latter and two camera stations occupied. The Shining Beauty has been working steadily all summer. It employs about thirty men. The ore—silver, copper and zinc, with a trace of gold—yields about \$49 to the ton. About thirty-five tons of supplies have been packed in for winter consumption, and it is understood that the company owning it are about to put in an up-to-date concentrator.

Dense smoke on August 26 rendered photographing impossible, and compelled the party to move on up the Beaverfoot valley to Moose creek.

Moose creek, as it is locally called, is in fact the actual source of Beaverfoot river. Utilizing the smoky weather for travelling, the party went direct to the head of the valley by means of a trail leading to a mine now being operated by the Shining Beauty company. Rain on the 27th and 28th cleared the atmosphere, and on the 29th and 30th climbs were made of Mt. Sharp and Helmet Mt., both peaks being situated at the head of Moose creek.

On September 3, a climb was made of Zinc mountain. On the east slopes of this mass the mine above referred to is situated. A tunnel has been pushed in more than 200 feet and some excellent ore taken out—zinc, silver and copper—but no work is now being done except the yearly development necessary to hold it. On the 4th stations were occupied along the north edge of the Washmawapta glacier, giving data to map the glacier and also overlooking the head of the Ottertail valley and Ochre creek, tributary to Vermilion river. From the 5th to the 9th it rained incessantly, and no work could be done.

Two other stations were occupied in connection with this tract of country. In all, nine peaks were climbed and eight camera stations occupied.

Moose creek is remarkable for the large flocks of wild goat seen on the steep slopes of Mts. Sharp and Helmet and around the moraines of the Washmawapta glacier.

Beaverfoot Range.

On September 13, the party proceeded up the Beaverfoot valley and crossing the watershed camped on the headwaters of Kootenay river. From now on, until October 2, the energies of the party were concentrated upon obtaining data to map the Beaverfoot valley and inclosing ranges, and to obtain as much data as could be got from summits along the Beaverfoot range.

The Beaverfoot valley is six to eight miles wide and densely timbered. On the east side a good pony trail leads up Beaverfoot and down Kootenay river to Windermere and Steele. On the west a wagon road connects Palliser station on the Canadian

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Pacific Railway with the Palliser Mill Company's camp, about ten miles up the river. Down the centre of the valley, on the Kootenay side of the watershed, open meadows dotted with ponds extend for about eight miles. These facilities were used to move the camp, but in the case of every ascent made on either side, it was necessary to cut out from three to four miles of trail through dense woods to attain a point from which a summit could be reached. From the crests of the Beaverfoot range splendid views were obtained of the broad Columbia valley, glistening in every direction as the sun shone on winding river and innumerable ponds and channels covering the valley bottom in a network; beyond, lay the serried, snow-clad array of the Spillimacheen mountains. To cover this section, eight peaks were ascended and thirteen camera stations occupied.

All the good timber tributary to Beaverfoot river is under license to the Palliser Mill company. A tract has been burned along the northeast slopes of the Beaverfoot range, but south of the meadows previously referred to, large tracts are found on both sides of the Kootenay valley that are still intact and would be of great merchantable value if there were a waterway of sufficient volume to carry the logs. The timber is chiefly spruce and Douglas fir with a considerable quantity of pine, particularly on the northeast side of the valley.

Game is very abundant, moose and smaller deer being found in the woods surrounding the meadows referred to, where there are a number of salt-licks, and goats on all the peaks above timber-line. The crests and long ridges of the Beaverfoot range seem to be a favourite spot for goats. They were seen here in every direction in flocks, sunning themselves, and were so tame and would come so close that they could be hit by tossing a pebble. Grouse of two kinds are very plentiful in the woods and ptarmigan on the slopes above timber. Indications of a few beaver were seen around the meadows near the watershed and in Ice river valley, but they are few, and it will only be by careful protection that they will be saved from extinction.

Kicking Horse Canyon.

Between the 6th and 15th October four ascents were made along the lower canyon of Kicking Horse river and eight camera stations occupied. The weather during this period was broken and the winter snows gradually collected on the summits, so the traverse of the railway line was picked up at Glenogle, where it had been discontinued the previous year, and on days when climbing was out of the question it was carried forward westerly to Golden.

Traverse of the Railway.

From the 16th to the end of October a careful traverse of the railway was carried from Golden to Donald and ties made with established survey corners, the main camp having been moved to Moberly for this purpose. Camp was broken up on November 1, and the party returned to Calgary.

Statistics of the Season's Survey

The season was an exceptionally fine one, the field work extending over 154 days. Of these, 48 days were spent in preparing for the survey, moving camp, rest on Sundays and storing outfit; 16 days were lost through bad weather, rain or snow; 6 were lost through smoke from bush fires; and the remainder, 84 days, were spent upon the actual work of the survey.

Altogether 47 ascents were made and 89 camera stations occupied, from which 471 plates were exposed. At each camera station a round of photographs were taken and azimuths to obtain orient points for the views. To reach the peaks with instruments, 24 miles of trail had to be cut through thick timber. Along the railway, 25 miles of traverse were made between Glenogle and Donald, each course being chained twice to ensure accuracy.

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Three kinds of plates were used, viz:—Seed's non-halation L. Ortho, Lumière, non-halation A orthochromatic and Cramer's slow isochromatic. The Seed plate has a unit of exposure of five seconds with the orange screen used, the Lumière ten seconds and the Cramer fifteen seconds. The Lumière plates give the best results.

Progress of the Work.

The topographical survey of the main range of the Rocky mountains has now been completed westerly as far as Columbia river at Golden. It extends, generally speaking, twenty miles on either side of the railway, being bounded on the north by parallel $51^{\circ} 31'$ N. latitude, by the Pipestone and Bow passes and by Blaeberry river; and on the south by parallel 51° N. latitude, by the summit of the range and by the south boundary of the railway belt. In order, however, to connect with the survey of the Selkirk range, from Beavermouth to Revelstoke it is still necessary to make a survey of the Spillimacheen mountains and the Dog-Tooth range, lying between Columbia and Beaver rivers south of the railway. There also remains a portion north of the railway between Blaeberry and Columbia rivers. The Spillimacheen mountains are of considerable importance, owing to mining interests held in their midst, and there is a growing demand for maps of that region. It is proposed to fill in the gaps outlined by another season's work.

The map work of the mountain territory surveyed is now being pushed forward as rapidly as possible. The tremendous influx of tourists, hunters and those engaged in scientific research has caused the railway company to add yearly to its mountain hotels, until what were formerly small chalets are now magnificent edifices offering the most refined comforts of civilization. This influx, to which a very considerable zest has been added by the formation of the Alpine Club of Canada, means an ever increasing revenue to Alberta and British Columbia through catering to the wants of these people. There is a constant demand for accurate maps. While it is impossible to complete a map of the whole until the field work is completed, this office has been endeavouring to put out advance sheets of the parts most required by tourists, and will, during the coming winter, get ready an advance topographical sheet of Yoho park with that object in view.

I have the honour to be, sir,

Your obedient servant,

ARTHUR O. WHEELER, D.L.S.

Topographer of the Department of the Interior.

DESCRIPTIONS OF TOWNSHIPS

DESCRIPTIONS

OF

SURVEYED TOWNSHIPS

Submitted by Dominion Land Surveyors during the Season of

1906-1907

APPENDIX No. 46.

LIST OF TOWNSHIPS DESCRIBED.

EAST OF PRINCIPAL MERIDIAN.		WEST OF SECOND MERIDIAN.	
Township.	Range.	Township.	Range.
15	7	52, 53, 54, 55, 56..	1
14, 15.....	8	52.....	2
7, 9, 10, 14	9	44, 52.....	3
1, 2, 6, 7, 8, 9, 14, 15.	10	52.....	4
1, 2, 6, 7, 8, 9.....	11	52.....	5
2, 3, 6, 7, 12, 13, 14.....	12	52.....	6
3, 4, 5, 7.....	13	52.....	7
3, 1, 5.	14	52.....	8
WEST OF PRINCIPAL MERIDIAN.		7, 52.....	9
17, 19	1	52.....	10
18	2	52.....	11
19, 20.	3	52.....	12
16, 19, 20, 23, 24	4	52.....	13
18, 19, 20.....	5	52.....	14
19, 20, 23, 24.....	6	52.....	15
22, 23, 24.....	7	52.....	16
15, 16, 17.....	10	14, 52.....	17
15, 16, 17, 18	11	52.....	18
34, 35.....	22	52.....	19
28, 32	23	52.....	20
6, 24, 35	25	50, 51, 52	21
6, 35	26	50, 51, 52.....	22
6, 7.....	27	50, 51, 52.....	23
5, 6, 7, 8.....	28	5, 11, 12, 50, 51, 52.....	24
5, 6, 7, 8, 9	29	11, 12, 51, 52.....	25
		7, 8, 52.....	26
		7, 8, 9, 10, 11, 52.....	27
		7, 8, 9, 10, 11.....	28
		6, 7, 8, 9, 10, 11, 14...	29

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List of Townships Described—Continued.

WEST OF THIRD MERIDIAN.		WEST OF FOURTH MERIDIAN—Con.	
Township.	Range.	Township.	Range.
51.....	1	58, 59, 61, 64.....	27
50, 51.....	2	13.....	29
21, 22, 23, 50.....	3	1, 3, 4.....	30
10, 21, 22.....	4		
21, 22.....	5		
21.....	6		
21.....	7		
21, 22.....	8		
9, 10, 11, 12.....	11		
9, 10.....	12		
29, 30, 31.....	19		
21, 22.....	27		
21, 22.....	28		
2.....	29		
WEST OF FOURTH MERIDIAN.		WEST OF FIFTH MERIDIAN.	
59, 60.....	7		1
59, 60.....	8	4, 15.....	2
59.....	9	8, 9, 11, 12, 17, 18, 19, 20, 50, 60.....	3
59, 60.....	10	12, 22, 56, 57, 58, 59, 60.....	4
3.....	12	58, 59, 60.....	5
1, 3, 6, 7, 65, 66, 67, 68.....	13	1, 5, 56, 57, 58, 59, 60.....	6
6, 7, 8, 35, 68.....	14	58, 59.....	7
6, 7, 8, 35, 68.....	15	50.....	8
6, 7, 8, 35, 68.....	16		11
6, 7, 64, 68.....	17	26, 27, 28.....	12
28, 64, 68.....	18	76, 77.....	14
64, 68.....	19	75, 76.....	15
51, 59, 64, 68.....	20	73, 74, 75, 76.....	16
58, 64, 68.....	21	74, 75.....	17
11, 64, 65, 68.....	22	84.....	19
64, 68.....	23	64.....	20
64, 68.....	24	64, 80, 84.....	21
61, 64.....	25	90, 84.....	22
61, 64.....	26	80, 84.....	23
		80, 84.....	24
		84.....	25
		84.....	26
		WEST OF SIXTH MERIDIAN.	
		18, 20.....	24

DESCRIPTIONS OF TOWNSHIPS.

TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 7.

15.—There are a few settlers immediately west of the portion of this township which I surveyed, but only a few, for the western portion of the township is nearly all muskeg. *C. F. Aylsworth, D.L.S., 1906.*

Range 8.

14.—West of Brokenhead river this township is very densely settled; east of the river it is only sparsely settled. On the west side of the river the roads have all been graded and ditched; on the east side of the river none of the roads are graded and it is only partially ditched.—*C. F. Aylsworth, D.L.S., 1906.*

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 8—Continued.

15.—There are no settlers living east of the lands I have surveyed in this township. The land in this township, so far as I could observe, is practically all muskeg. *C. F. Aylsworth, D.L.S., 1906.*

Range 9.

7. This township is easily reached by the Dawson road from Ste. Anne, and the Sprague trail—which leaves the Dawson road in section 11, township 8, range 9, and runs in a southerly and easterly direction passing through the northeast quarter of section 36, in township 7, range 9. Both the Dawson road and the Sprague trail are in good condition. No entrance, except as above, could be made into this township with horses in summer time. The lower portions of this township are covered with a thick growth of peaty moss and the greater part of the higher portions is sandy and stony, though some parts have a thin top dressing of black loam. In general the soil of this township is not good for agriculture, though a small portion of arable land consisting of black loam on a subsoil of sandy loam or sand is found in portions of sections 21, 22, 27, 28, 32 and 33. The whole of the surface of this township is covered with bush or heavy scrub, with occasional marshes scattered throughout the township. The southeastern quarter of the township is swampy and in some places there are floating bogs or muskegs which render this portion of the township nearly impassable. The northern and northwestern portions consist of sandy and stony ridges. The timber consists of tamarack, spruce, jackpine and poplar, very little of which could be used for lumber as it is too small or too crooked. A few railroad ties and fence posts could be cut in the eastern portions of the township. Practically the whole of the central and western parts of the township have been burnt over and the timber is nearly all fire-killed, but is mostly standing yet. A small amount of coarse hay could be cut in sections 29, 30 and 31. Other small hay meadows are scattered throughout the township, but these would be suitable only for pasturage. Water is plentiful and permanent in the eastern and southern portions of the township but the northwestern portion is dry, and in a dry summer, water could be got only by digging, except for one marsh located at the northeast corner of section 30. All the water is fresh. A shallow lake, about one hundred and forty acres in area, is located at the corner of sections 1, 2, 11 and 12. Brokenhead river takes its rise in sections 35 and 36. A small branch comes out of each of the above mentioned sections and they unite in section 2, township 8, range 9. These branches at the time of survey were merely tiny streams about one foot wide and one foot deep with a slow current. No falls or rapids occur and no water-power could be developed. Practically the whole of sections 1, 2, 3, 10, 11, 12, 13, 14, 15 and 23 are more or less flooded all the time. The climate is very mild and no summer frosts occurred. Fuel consisting of tamarack, spruce and jackpine is plentiful in all parts of the township. No coal or lignite veins were seen. No stone in place was seen though surface stones and boulders were plentiful in the northwestern portion of the township. No minerals of economic value were encountered. Traces of moose and bear are plentiful, but other game is scarce.—*H. S. Holcroft, D.L.S., 1906.*

9.—This township is reached from Ste. Anne on the Canadian Northern railway, by using the Dawson road as far as section 17, in township 8, range 9. At the house of a settler named Edward Harrison, in this section, I left the Dawson road and followed Chartier's logging trail, which has a general northeasterly direction to Chartier's sawmill, in section 12, township 9, range 9, east of the principal meridian. A good trail leaves this trail in section 1 and runs north and then west to Nolin's old sawmill in section 14. This township is composed of three general classes

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 9—Continued.

of country: (1) High level ground covered with poplar, willow and windfall. This class occupies southwest half section 25, northeast half section 26, southwest half section 35, section 34, northeast quarter section 33, section 1, northeast half section 2, section 12, section 11, southwest quarter section 13, west half section 15, sections 16, 20, 21, southwest half section 29, east quarter section 30 and east half section 31. In places this class also carries a little jackpine. The soil is light and sandy, with numerous stones and boulders. (2) Swamp and muskeg, heavily covered with spruce, tamarack, and cedar, from 2 to 10 inches in diameter, and occupying southwest three-quarters section 36, northeast third section 35, northeast third section 25, section 24, north two-thirds section 13, north two-thirds section 14, section 23, southwest half section 26, northeast half section 27, east half section 15, section 10, section 3, southwest half section 2 and southeast quarter section 4. The soil is a black loam or vegetable mould. (3) Swamp and muskeg, partly open and partly covered with dead spruce and tamarack and willow scrub. This class occupies northeast quarter section 36, southwest half section 33, east half section 32, northeast three-quarters section 28, southwest half section 27, northeast half section 22, north half section 4, south half section 9, sections 5, 6, 7, 8 and 18, west half section 17, section 19, west half section 30, west quarter section 31. This is wet and marshy and covered to a depth of several feet with moss. The location of the timber is described above. The spruce and tamarack is all too small for lumbering purposes, the best having been taken out by the settlers around Ste. Anne. There is a poplar and jackpine ridge in section 12, which, however, has also been cut over. No hay is to be found. Water is all fresh and the supply abundant and permanent. A small stream enters the township on the south boundary of section 2 and crosses the east boundary of section 3 at eighteen chains north of the south boundary. It then empties into the large marsh occupying the southwest corner of the township, and is not noticeable on any other of the lines in the township. The area described above under (3) would probably be flooded to a depth of two feet in a wet season. At the time of the survey (May and June), however, water occurred only to a depth of about six inches. No water-power is available. The climate is moderate, with light frosts in the early part of June. Firewood, consisting of dead spruce, tamarack and poplar, is everywhere plentiful. The supply is sufficient for the wants of settlers for many years. No stone quarries or minerals are to be found. The game is moose, red deer, bear, grouse, porcupine, weasels and wild turkeys.—*J. L. R. Parsons, D.L.S., 1906.*

10.—This township was reached from section 34, township 9, range 9, by my own trail northerly along the east boundaries of section 4 to the quarter section corner on the east boundary of section 9. From this point my camp had to be packed by men to section 27, as the surface was of too soft and swampy a nature to allow the use of horses and wagons. The soil of the township may be divided into three general classes: (1) High ground, wooded with poplar, willow and a few jackpine. This class is sandy, with many boulders, but in a few places white clay was encountered. It is, however, of too light a quality to be suited for agricultural purposes. It comprises the northeast quarter section 32, 33, southwest three-quarters 34, 27, east half 28, northeast quarter 22, 23, south half 24, 14, 13, west half 3, 4, 6 and 7. (2) Swamp or muskeg, wooded with spruce and tamarack, or fire-killed spruce and tamarack. The soil in this class is invariably a deep black loam, but is not suited for agricultural purposes on account of the presence of a great deal of water. It can doubtless, however, be drained and should then be valuable. It comprises section 36, northeast quarter section 35, southwest three-quarters sections 32, 31, 29, west half 28, east half 26, northeast half 24, south half 22, 21, northeast quarter 20, east half 19, 11, 12, 2, northeast and southwest quarter sections 1, 10, northwest three-quarters 9, 8, northeast quarter 5 and northeast quarter 3. (3) Marsh or muskeg, containing a great deal of water, with scattered

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 9—Continued.

dead tamarack and scrub, and being composed of moss to a depth of several feet. It is unfit for agriculture. This class comprises southeast quarter 35, 25, north half 30, middle third of 20, east half 18, 17, 16, west half 15 and middle third 1.

The surface is level and covered with timber as described above. All the best timber has been cut in the township, but the young tamarack, spruce, poplar and jack-pine, should be large enough to cut in a few years. There is no hay. Fresh water is abundant and the supply permanent. A branch of Brokenhead river crosses section 36. It is two chains wide and four feet deep and flows with a current of about one and one half miles per hour. Its banks are well defined and flooding is therefore improbable. No water-powers occur. The climate is moderate with abundant rainfall in June (during the time of the survey), with no frosts at this time. Good fuel is everywhere obtainable among the fire-killed timber and windfall. There were no stone quarries or minerals found. Moose, red deer, bear and partridge are all quite numerous.—*J. L. R. Parsons, D.L.S., 1906.*

14.—The southeast corner of the township is crossed by Lac du Bonnet branch of the Canadian Pacific railway, a wood siding, Milner, being in section 12. The township is mostly swamp, muskeg or sand ridge, but there is a strip of good land along the west boundary and perhaps some more about the middle of the northeast quarter of the township. The latter, however, is covered with heavy woods, both green timber and brulé. A number of Galicians have settled in the western tier of sections but on account of their buildings being scattered in the scrub it is impossible for me to show the position of them in my notes. The timber is mostly spruce and tamarack, small in the wettest parts of the swamps and larger in the drier portions. All the large timber has been cut. Much cordwood is cut here every winter. I believe that this township is in a wood or timber limit belonging to J. D. McArthur. I saw no hay meadows, except those claimed by the settlers along the west boundary. The water is fresh. There is a small lake in section 24 and there are several small creeks which lose themselves in the swamps. I saw no coal, minerals or stone of any economic value. Moose, deer, timber wolves, chickens and partridges are plentiful.—*Geo. H. Watt, D.L.S., 1906.*

Range 10.

1.—The greater part of the soil in this township is useless, being only fourth class, made up, principally of floating muskegs and spruce and tamarack swamps. There are, however, about eight or ten good quarter sections in the southwest corner which, when cleared, will make good farming land. The greater part of the land is covered with bush, consisting principally of spruce and tamarack averaging from three inches to seven inches in diameter, and a considerable amount of spruce and tamarack and willow scrub, especially in the swamps and muskegs. Hay can be had in the southern part of the township, enough to supply the settlers. There are no streams of any kind to be found, but good water can be had in the swamps and by digging a few feet in almost any place. The climate is the general Manitoba climate, without any indications of summer frosts. Fuel can be had in unlimited quantities all through the district, consisting principally of spruce and tamarack. There are no coal or lignite veins, minerals or stone quarries to be found. Moose is about the only kind of game to be found. The Emerson-Vassar branch of the Canadian Northern railway runs through the northeast corner of the township. It is impossible to reach this, however, from the central or southern part of the township on account of swamps and muskegs. There is a trail leading from the settlements in the township to the west, but even this is difficult to travel on except in the winter.—*John Molloy, D.L.S., 1906.*

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

2.—The greater portion of the soil in the township is a black or sandy loam from five inches to eighteen inches deep with a sandy clay subsoil and would be fit for farming purposes only on account of the land being so wet and almost impossible to get into. All the land is covered with bush consisting mostly of spruce, tamarack from five inches to ten inches diameter, and poplar, willow and jackpine scrub and brulé equally distributed throughout the township. The southwest quarter of the township is mostly dry tamarack about five inches diameter with low willow scrub and swamp. There are no hay meadows, but if the land was cleared and drained hay could be had in large quantities all through the township. All the water is free from alkali and of first-class quality. There are no streams to be found. The climate is the general Manitoba climate with no summer frosts. Fuel can be had in abundance all through this district, consisting of spruce, tamarack, poplar, cedar and jackpine. There are no coal or lignite veins, minerals or stone quarries. Game consisting of moose, deer and bear are very plentiful all through this section of country. A winter trail leading to Woodridge, a village on the Canadian Northern railway about two miles north, passes through the western portion of the township and continues southeast to the settlement of Pine Valley in township 1, range 12. There is a store, postoffice and school in both these places. The Emerson-Vassar branch of the Canadian Northern railway passes through the southwest corner of the township. *John Molloy, D.L.S., 1906.*

6.—This township is situated about sixteen miles northerly from Bedford station, on the main line of the Canadian Northern railway, and is most easily reached by the Mennonite trail from Bedford. This trail passes over a range of low hills, and it is a very good wagon trail. The soil in the higher parts of the township is a light sand mixed with stones and gravel in most places and is unsuitable for cultivation. The swampy portions are covered with a layer of peaty moss of varying thickness and generally have a sandy subsoil. They would have to be drained before cultivation could be successfully carried on. The whole of sections 1, 12, 13, 24, 25, 19, 30, 31 and 32, the easterly portions of sections 2, 11, 14, 16 and 23, and the westerly portions of sections 20 and 29 are swampy and covered with tamarack and spruce and are nearly level. The remainder of the township is rolling. A range of low hills passes through this township in a northeasterly and southwesterly direction, beginning at the southwest corner and passing out at the northeast corner of the township. These hills are covered with a sparse growth of small jackpine. About sixty-five per cent of the township is covered with wood, about twenty-three per cent with scrub, consisting of jackpine, willow and poplar and the remaining twelve per cent is either open or semi-open. The timber remaining in the township consists of tamarack, spruce and jackpine and a few cedar trees in sections 1 and 2, nearly all of which are under ten inches in diameter and not good enough for boards. Railroad ties could be made from the tamarack in sections 25, 24, 13, 12, 1, and 2 in the east and in sections 18, 19, 20, 29, 30, 31 and 32 in the west. The portions of this timber unsuitable for ties could be made into cordwood. Some cordwood could also be cut in sections 17, 16, 15, 14, 11, 10 and 9. A few hay meadows are scattered over the township and they produce a small crop of coarse hay. All the water is fresh and is plentiful and permanent in the swamps, but entirely absent in the higher parts of the township. There are no permanent streams. During the season I was operating in this township the climate was good; there were hot days and cool nights with no summer frosts. There was sufficient rain. Fuel consisting of tamarack, spruce or jackpine can be secured in abundance in all portions of the township. No coal or lignite veins are known to exist in the township. No exposures of rock in place and no valuable economic minerals were seen. Bear and moose are plentiful, and some few traces of deer were seen. Of the smaller game there are some ruffed grouse, prairie chicken and a

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

great many rabbits. Timber wolves and coyotes are quite numerous.—*H. S. Holcroft, D.L.S., 1906.*

7.—This township is most easily reached by the Dawson road from Ste. Anne which passes through sections 33, 34, 35 and 36, or by taking the Sprague trail, which leaves the Dawson road in township 8, range 9, the southerly portion of the township may be reached. Both the Dawson and Sprague roads are fairly good for travelling on. About two-thirds of this township is of a light sandy and stony soil, very little of which is suitable for agricultural purposes as it is too light and dry. The remaining one-third is swampy and covered to a considerable depth with a peaty moss, all of which, at present, is too wet for cultivation and even if drained would be of very little agricultural value. The higher portions are rolling and covered with a sparse growth of jackpine or scrub. The lower portions are very nearly level and are covered with a dense growth of tamarack and spruce. Sections 31, 32, 33, 29, 28, 27, 26, 20, 21, 22, 16 and 6 and the northerly portions of sections 34, 35, 36, 15, 14 and 9 and the easterly portions of sections 19, 18 and 7 and the westerly portions of sections 23 and 25 are covered with jackpine, poplar, balm of Gilead and scrub, with a few small open places. The remainder of the township is covered with a dense growth of tamarack and spruce. About seventy-two per cent of the surface is timbered, about twenty per cent scrub and the remaining eight per cent is open or semi-open. But very little timber suitable for boards is left in this township. In the westerly portion of sections 7, 18, 19 and 30 there are a few trees over ten inches in diameter. The northern and central portions of the township are covered with small jackpine and some poplar, all of which is small and suitable only for fuel. The southeasterly portion of the township and the westerly parts of sections 7, 18, 19 and 30 are covered with tamarack and spruce, some of which would make railroad ties. The remainder is suitable only for fuel, of which there is a large quantity. Very little hay could be cut in this township. A few small hay meadows are scattered throughout the township, but the growth of grass on these is light and stunted. Water can be got near the surface in all sections except sections 31, 32, 29 and 17, in which sections it would be necessary to go to some depth for it. The supply would be sufficient and permanent. All the water is fresh. No running streams are in this township. None of the land is liable to be flooded. No head of water is obtainable in this township. The climate is good; sufficient rain, much sunshine, cool nights and no summer frosts occur. Fuel consisting of tamarack, spruce, jackpine and some poplar is plentifully distributed over the whole of the township. No coal or lignite veins were discovered. No stone in place was encountered. No minerals of economic value were seen. Moose, bear, and red deer were plentiful. Prairie chicken and partridge were found in small numbers. No traces of other game were seen.—*H. S. Holcroft, D.L.S., 1906.*

8.—This township is most easily reached from Ste. Anne station by the Dawson road. The travelling on this road is fairly good with the exception of about three-quarters of a mile of corduroy. The whole southwesterly quarter of the township and the westerly part of sections 10 and 15 are composed of sand with boulders in most places. In places the surface is covered with a thin layer of partially decomposed vegetable matter, but this layer is too thin to aid appreciably in enriching the soil. The remainder of the township is covered with a thick layer of peaty moss, in the swamps, and with matted grass roots in the marshes. All of the swamps are too wet to be cultivated until drained. If well drained the swamps and marshes would probably produce the usual vegetables and cereals of the district. The sandy portions are of too light a soil and are too dry to produce much growth. The southwestern portion of the township is rolling. The remainder is nearly level. With the exception of the marshes the whole of the township is wooded or is covered with scrub. Marshes and hay meadows occupy about eight per cent of the surface. Woods or

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

scrub, mainly woods, cover the remaining ninety-two per cent. The larger marshes are located in sections 13, 14, 15, 22 and 23 and the northern parts of sections 31, 32 and 33, but very small marshes and hay meadows are located at intervals over all the township. A large broken marsh covered in many places with scattered willow and scrub tamarack extends throughout portions of sections 13, 14, 15, 22, 23 and 24. Located at intervals throughout the remainder of the township, with the above mentioned exception of the southwest quarter, are many marshes varying from two or three chains to fifteen or twenty chains in width. About twelve per cent of the township is covered with scrub, generally willow or scrub tamarack, spruce, poplar and balm of Gilead, with a small amount of scrub jackpine. This scrub is well distributed over the township. The best of the original timber in this township has been removed, but there yet remains a small quantity of spruce and tamarack that would make boards. Sections 4, 5, 6, 7, 8, 9, 15, 16, 17 and 18 contain practically only jackpine and poplar, all too small for boards. There is a small quantity of cedar averaging about seven inches in diameter in sections 28, 29, 30, 31, 32 and 33. Tamarack and spruce are well distributed over all the northern and eastern portions of the township, tamarack being the most plentiful. Throughout the township the tamarack would average about seven or eight inches in diameter and the spruce about six or seven inches. There is very little timber over ten inches in diameter. A portable sawmill, not at present in use, is in the northwest quarter of section 16. But little hay could at present be cut in this township. In sections 12, 13, 17 and 18 about ten tons of hay could be cut annually. A few small hay meadows are scattered throughout the township, but these produce only a very small amount of grass suitable for hay. All the water in the township is fresh. In sections 4, 5, 6, 7, 8, 9, 16, 17 and 18 some difficulty might be experienced in getting water in a very dry season, but elsewhere in the township water is permanent and can always be obtained by digging. Windy lake, a small body of fresh water about sixty acres in area, lies in sections 31 and 32, and a part of Oak lake, also fresh water, in sections 32 and 33. One small stream of clear water about three feet wide and six inches deep flows into Windy lake in section 31. This is the only running water in the township. None of the land is liable to be flooded to a serious extent, but a great deal of the lower lands would have to be drained before commencing successful agricultural operations. There is no water-power in this township. The climate during the season of operation was reasonably equable, with the exception of a fairly severe frost on the night of July 30, 1906. Fuel consisting of tamarack, jackpine, poplar, spruce and balm of Gilead is abundant in all parts of the township. No coal or lignite veins were encountered. No stone in place was encountered in this township, but boulders and stones, mostly granite, are scattered over nearly the whole township, especially in the southwest portion. No minerals of economic value were seen. Moose and bear are quite numerous. A few black partridge and ruffed grouse were seen, also a few traces of deer. No traces of other game were seen.—*H. S. Holcroft, D.L.S., 1906.*

9.—I reached this township from township 9, range 9, by the old logging trail which crosses sections 7 and 18. It was in excellent condition at the time of the survey and extended eastward across the south part of sections 20 and 21 to the southwest corner of section 22. Thence I cut a trail through sections 15, 14 and 12 to the east boundary of the township. The soil is either moss, black loam or sand. The moss occurs in the marshes and is a peaty moss extending over eighteen inches in depth. The black loam occurs in the spruce and tamarack muskegs and when drained should be splendid agricultural land. This comprises the largest part of the township. The sand is found associated with the poplar and willow bush and is valueless for agriculture, containing also many stones and boulders. The surface is everywhere covered with bush. The northern half of the township is covered

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

with tamarack and spruce. Sections 18, 17, 16, 9, 8 and 7 are covered with poplar and willow with scattered jackpine and spruce, and the balance of the township with spruce and tamarack. The township has all been cut over, and the buildings of Nolin's old mill are still standing in the southwest corner of section 20. There is but very little timber large enough to cut at present, it being nearly all under ten inches in diameter. It should, however, in a few years grow to a valuable size if not destroyed by fire. A small quantity of marsh grass may be obtained in a hay marsh along the north boundary of section 16 and also in the south part of section 14; also a small amount of blue grass along the banks of Brokenhead river in section 36. A branch of Brokenhead river crosses section 36. Where it leaves the township it is thirteen links wide, 3 feet deep and flows at two miles per hour. The land is not liable to be flooded. Fresh water of excellent quality is to be found everywhere in the township. No water-power is available. The climate is moderate with no frosts at the time of the survey (July). An abundance of fuel is to be found in the form of dead trees. No stone quarries or minerals were found. The game is bear, moose and deer.—*J. L. R. Parsons, D.L.S., 1906.*

14.—This township is crossed by the Lac du Bonnet branch of the Canadian Pacific railway. There is a wood siding on section 28 where J. D. McArthur has a log and wood camp. The Winnipeg Electric Railway company have cleared a right-of way 1.50 chains wide across the township on which they have erected a pole line for the transmission of electrical energy to Winnipeg. A fairly good road has also been made along this right-of-way. The greater part of the township is swamp or sand ridge which at present is unfit for cultivation. There are a few quarter sections of fairly good land in the northeasterly part of the township and near the Six-mile siding on the railway. The timber is chiefly tamarack and spruce, a great deal of which has been cut out for logs and wood by J. D. McArthur, who, I believe, has a limit extending over the whole township. On the higher ground where the timber has not been burned off completely, there is some heavy poplar and birch. There are no hay lands, running streams, stone quarries, minerals or coal that I am aware of. Game, consisting of rabbits, partridge, chickens, jumping deer and moose, is plentiful.—*Geo. H. Watt, D.L.S., 1906.*

15.—The southeasterly corner of this township is crossed by the Lac du Bonnet branch of the Canadian Pacific railway, and there is a good sleigh road from Lac du Bonnet station leading to section 25 of the township. A large proportion of the township is bog and swamp, but there are some dry ridges. The soil on the ridges is generally fair with sand or clay subsoil, except in the southerly part of the township where the subsoil is stony clay or hardpan. The heavy dead standing and fallen timber and thick underbrush are conditions that will keep settlers out for some time. The timber on the ridges has been poplar, spruce, birch and ash, but the greater part has been fire-killed and a thick growth of underbrush has sprung up. In the swamps and muskegs the timber is tamarack and spruce, mostly small, from eight inches in diameter down. The largest trees have all been cut and taken out for logs. There are meadows where hay has been cut, but the hay is coarse. The water in the swamps is fresh. There is only one sluggish stream in the eastern part of the township. There is no drainage at present, but the township could be easily drained into Winnipeg river. I saw no minerals, coal or stone of any value. Moose, timber wolves, bears, chickens and partridge are plentiful.—*Geo. H. Watt, D.L.S., 1906.*

Range 11.

1.—The soil in this township is mostly third-class, although there are a few quarter sections in the western part of the township that rank as second class, the

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 11—Continued.

soil being a rich black loam and clay subsoil. All of the land is covered with heavy bush, consisting principally of spruce and tamarack from five inches to ten inches in diameter, with a few small bluffs of pine and poplar averaging about seven inches in diameter. There is no hay to be found, but in the township to the east a considerable amount of hay can be secured. There are no streams or creeks in the township, but water can be obtained in almost any part of the township either in the swamps or by digging a few feet. The climate is the general Manitoba climate, with no indications of summer frosts. Fuel can be had in unlimited quantities all through this section of country, consisting principally of spruce, tamarack, jackpine and poplar. There are no coal or lignite veins, stone quarries or minerals to be found. Moose and black bear are almost the only kinds of game in this district. Good trails from the northern part of this township to the stations of Badger and Vassar to the north on the main line of the Canadian Northern railway, and to Pine Valley, a station on the Emerson-Vassar section of the Canadian Northern railway, just being erected in the township to the east. In all these places there are schools, postoffices and small country stores. The Emerson-Vassar branch of the Canadian Northern railway runs through the northern part of the township.—*John Molloy, D.L.S., 1906.*

2. Nearly all the land in this township is of third and fourth class quality, being mostly sand having about two inches of sandy loam which is unfit for producing crops. The land is covered mostly with jackpine scrub about six feet high, although there is more heavy bush in the southern portion of the township, consisting of jackpine about seven inches in diameter and some spruce and tamarack, mostly dry, about five inches in diameter scattered throughout the township. There is very little hay to be found, but it could be obtained in a few places by clearing the bush off. All of the water is of first class quality, and the supply is sufficient and permanent. It can be had by digging in almost any part of the township, except on the jackpine ridges, where it might be a little difficult to obtain it. There are no streams to be found. The climate is the general Manitoba climate, without any summer frosts. Enough fuel for present purposes can be had in the township, and the surrounding townships are well supplied with wood for fuel, consisting of spruce, tamarack, jackpine and cedar. There are no coal or lignite veins, minerals or stone quarries to be found. Game consisting of moose, deer and black bear are very plentiful all through this section of the country. A good trail passing through the eastern part of the township runs from Badger, a station on the Ontario division of the Canadian Northern railway on section 6, township 3, range 12, to the settlement of Pine Valley in section 20, township 1, range 12, where the Emerson-Vassar branch of the Canadian Northern railway passes. There is a postoffice and store in both these places, as well as a school at the settlement of Pine Valley.—*John Molloy, D.L.S., 1906.*

6.—The soil in this township if it were dry would be nearly all black loam, but as all the township with the exception of parts of sections 35, 34, 33, 27 and 28, which are sandy, consists of tamarack, muskeg and almost impassable floating bog, the soil is thereby rendered useless. The greater part of the township is covered with bush except in the southeastern part, which consists largely of floating bog with a low willow scrub. The timber varies from three to ten inches in diameter, all tamarack, with the exception of a small quantity of jackpine in the northeastern corner, and is equally distributed throughout the township. There are no hay sloughs to be found in the township, and very little hay to be had in this district. Water can be had in any part of the township without digging, and at any time of the year. There are no streams or creeks of any kind to be found. The climate is the general Manitoba climate without any indications of summer frosts. Fuel can be had all through this district, consisting principally of tamarack and spruce. No stone quarries, coal or

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 11—Continued.

lignite veins or minerals were found. Black bear and moose are very plentiful all through this section of country and are about the only kind of game to be found. A trail leading to Woodridge and Ste. Anne passes through the township to the west, and is always in good condition, being along the sand ridges, but it is impossible to get a team or wagon into the township in summer. I was, therefore, obliged to pack all my tents and provisions into the township from section 24 in the township to the west.—*John Molloy, D.L.S., 1906.*

7.—This township may be most conveniently reached by wagon road from Ste. Anne station on the Canadian Northern railway, from which place it is distant only about twenty-five miles. The road leading from Ste. Anne is that known as the old 'Dawson road' and is well travelled as far as Brokenhead river, a distance of sixteen miles. The township may also be reached by a wagon road from Bedford, another station on the same railway, and the distance is considerably less from this point, though Ste. Anne is the preferable supply station. The soil of this township is composed chiefly of sand on the higher portions and black muck or peat in the swamps, and almost the entire township is underlaid by sand, in some places mixed with gravel. Outside of Whitemouth river, which flows northerly through the eastern part of the township, no water was found upon the surface during the time of the survey, but anywhere throughout the township good water could be found by digging to a depth of from three to six feet. The higher portions of the township being composed entirely of sand are of little value, unless perhaps for the raising of potatoes, but the swamps when drained will probably be suited to general agriculture. Almost the entire surface of this township is covered by a growth of scrubby timber; no prairie of any account being found. The timber is of comparatively little value, small black spruce predominating in the swamps and jackpine on the sand ridges. A few tamarack are found sufficiently large for milling, and some good-sized white poplar occur, but as the greater portion of the township had been visited by fire not many years ago the existing forest is mostly young and the small trees formed into thickets of poplar, spruce, tamarack, &c. The jackpine does not seem to have been affected to the same extent as the other trees by the fire, and is therefore found of larger size, but because of its stunted, gnarly nature is unsuited for the manufacture of lumber. Some marsh hay is found in various sections of this township, notably sections 7, 8, 9, 15, 16, 17, 18, 19, 20, 21, 28, 29, 30, 32 and 33. It is of the quality commonly found in sloughs and marshes and when cut in proper season makes good feed for horses or cattle. Whitemouth river affords the chief surface supply of water on this township and is composed of good fresh water. Good water may, however, be found almost any place in the township by sinking wells to a depth of a very few feet. For the use of my men and horses I usually found an abundance at a depth of about three feet, and never found it necessary to sink more than seven feet. The water level might, however, vary very considerably during different years and seasons, the present year having been a very dry one. Whitemouth river, which in this township has an average current of only about one mile an hour, is not capable of furnishing any significant water-power. Besides the volume of the stream is quite small in this locality. The locality of this township being so near Winnipeg, the climatic conditions are similar and are, therefore, on record at the meteorological office. This township being thickly wooded with various kinds of timber, there is an abundant local fuel supply. No coal is known to exist in the locality. No stone quarries are known upon the township. No minerals are known to occur. Large game, particularly moose, were observed to be common in this township and vicinity. White-tailed jumping deer, black bears, lynx, wildcats, foxes and porcupines were also met with and are common in the locality. Few water fowls were observed, but prairie

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Range 11—Continued.

hens, ruffed grouse and spruce grouse were common. Whitefish, pike and pickerel are found in Whitemouth river.—*J. W. Tyrrell, D.L.S., 1906.*

8.—This township may be most conveniently reached by wagon road from Ste. Anne station on the Canadian Northern railway, from which place it is distant only about twenty-five miles. The road leading from Ste. Anne is that known as the old 'Dawson road' and is well travelled as far as Brokenhead river—a distance of sixteen miles. The township may also be reached by a wagon road from Bedford, another station on the same railway, and the distance is slightly less from this point, though Ste. Anne is the preferable supply station. The soil of this township is composed chiefly of sand on the higher portions and black muck or peat in the swamps, and almost the entire township is underlaid with sand, in some places mixed with gravel. The sandy sections of the township are of little value unless perhaps for the raising of potatoes, but the swampy lands being composed of a rich black muck, will, when drained, probably be suited for general agriculture. Almost the entire surface of this township is covered with a thick growth of small timber, only two or three small prairie spots having been found. The timber of this township is of comparatively little value, being small and unsuited for milling, with the exception of a few scattered tamarack. The abundance of the various trees is represented by the order in which they are named following: black spruce, white poplar, jackpine, tamarack, balsam, willow, cedar, birch and alder. The greater part of the township has evidently been swept by fire not many years ago, causing the existing forest trees to be young and small. The amount of natural hay growing upon this township is small, but meadows were noted upon the following sections: 1, 2, 3, 4, 9, 10, 11, 12, 14, 15, 16, 22, 27, 28, 31 and 32. Many of the above being very small. The quality is that of the ordinary marsh hay, which when cut in proper season makes fairly good fodder. This township contains no surface supply of water other than that found in the marshes, but by the sinking of wells plenty of good water may be obtained from the underlying sand and gravel beds. The amount of water in the marshes, and also the depth of water level in the soil no doubt varies very much from season to season and year to year. There are no water-powers. The locality of this township being so near to Winnipeg, the climatic conditions are similar—very cold in winter and hot in summer, and subject to very sudden changes. No summer frosts were experienced. Fuel in the form of various kinds of timber is abundant throughout the whole district. No stone quarries were seen. No minerals are known to occur upon this township. Large game, particularly moose, were observed to be common in this township and vicinity. White-tailed jumping deer, black bears, lynx, wildcats, foxes and porcupines were also met with and are common in the locality. Few water fowls were observed, but ruffed grouse and spruce grouse were plentiful and a few prairie hens were seen. Whitefish, pickerel and pike are found in Whitemouth river in the township to the south and east.—*J. W. Tyrrell, D.L.S., 1906.*

9.—This township was reached by my own trail from township 9, range 11, which enters the township in section 7; thence runs northerly to section 18, thence easterly and northeasterly to the northeast corner of section 17, thence easterly along the north boundaries of sections 16 and 15 to its end, 20 chains west of the northeast corner of section 15. The soil in this township is sand, black loam and moss. the sand (with boulders), occurring in the parts timbered with poplar and willow; the black loam in the spruce and tamarack muskegs and moss in the very wet muskegs. At present the soil is of no use whatever, but if the country can be drained, the areas of black loam should prove to be very rich lands. The surface is everywhere wooded, except a large open muskeg comprising section 25, east half section 26, northeast quarter section 23 and north half of section 24. The timber

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Range 11—Continued.

is very much mixed in this township, the marshes and muskegs (covered with spruce and tamarack) being separated by many small sand ridges supporting poplar and willow. There is no timber over ten inches in diameter, except that in a small area in the east part of section 1 and the southeast quarter of section 12 which contains some good tamarack, spruce and cedar. This, however, was cut over a number of years ago and the best of it taken out. A small amount of blue grass occurs on the banks of the branch of Brokenhead river which crosses sections 16, 17, 20, 29 and 30. Water of excellent quality is everywhere abundant. The branch of Brokenhead river which crosses the township has an average width of 20 links, depth of one and one-half feet and flow of one and one-half miles per hour, and its water is fresh. It runs in a well defined valley and the land is not liable to be flooded. The creek bed is a little below the general level of the township and could be used to drain the land in its immediate vicinity. No water-power is available. The climate is moderate, with no summer frosts at the time of the survey (July). Fuel is everywhere plentiful in the form of dead trees. There are no stone quarries or minerals. The game is moose and bear.—*J. L. R. Parsons, D.L.S., 1906.*

Range 12.

2. The soil in this township is nearly all third and fourth class, as it consists principally of sand with a sandy or gravel subsoil. It is almost useless for farming purposes. Nearly all the surface is covered with bush and scrub consisting principally of jackpine, spruce and tamarack from two inches to eight inches in diameter. There is scarce'y any hay to be found in this township. The water is all of first-class quality, and is very plentiful in the swamps, but is difficult to get, even by digging, on the sand ridges. The land is not liable to be flooded. Fuel is very plentiful all through this district, consisting principally of jackpine, spruce and tamarack. There are no stone quarries, coal or lignite veins or minerals to be found. The principal game found is black bear, moose and deer. The township is well traversed with trails running to Pine Valley to the south, where there is a large settlement, and to the stations of Vassar and Badger, on the main line of the Canadian Northern railway, which passes through the northern part of the township. There are small stores and postoffices in these places, but no schools.—*John Molloy, D.L.S., 1906.*

3.—The northern part of this township is almost useless for farming purposes, as it consists mostly of sand ridges and swamps. The soil in the swamps is a black loam, and would be good agricultural land if cleared and drained. The surface is mostly heavily timbered, the eastern part being covered with spruce and tamarack from three inches to eight inches in diameter, and the western part with jackpine from two to eight inches in diameter. All the water is first-class quality, and is plentiful, especially in the swamps, where it can be had at any time of the year without digging. There are no water-powers in the township. The climate is the general Manitoba climate, with no indications of summer frosts. Fuel is very plentiful all through this section of country, consisting principally of spruce, tamarack and jackpine. There are no coal or lignite veins in the township, and no stone quarries or minerals. Game consisting of bear, moose and deer are very plentiful all through the district. The main line of the Canadian Northern railway passes through section 6, where the station of Badger is situated. At Badger there is a store and postoffice. The township is well crossed with trails running to the line of railway, which have been used for hauling out wood and lumber.—*John Molloy, D.L.S., 1906.*

6. There is very little land in this township fit for farming purposes, as it is mostly covered with spruce and tamarack. A few quarter-sections along the northern tier of sections are not quite as wet as the remaining part of the township. Sections

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Range 12—Continued.

3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 18, 19 and 30 are almost useless for anything, as they are nearly all covered with tamarack bluffs about three inches diameter, low willow scrub and almost impassable floating bog. The land along the banks of Whitemouth river, which enters the township on the east boundary of section 24 and leaves the township on the north boundary of section 33, is high and dry, mostly covered with poplar and thick willows, but only extends for about ten chains from the bank. The river has an average width of about forty feet and an average depth of about two and a half feet, but seems to get much deeper and wider as it leaves the township. A small stream which first appears on section 6 and passes through sections 7, 8, 17, 16 and 21, joins Whitemouth river in section 28. The greater part of the township is covered with spruce and tamarack from three to ten inches in diameter, except along Whitemouth river, where the timber is poplar, elm, birch and balsam. The only hay to be found is in small sloughs along Whitemouth river, and a considerable quantity along the creek in the sections above mentioned. Plenty of water can be had in any part of the township without digging. The land is not liable to be flooded from Whitemouth river. There are no waterfalls or rapids from which power could be developed. The climate is the general Manitoba climate, without any indications of summer frosts. Fuel can be had in large quantities all through this section of country, consisting principally of spruce and tamarack. There are no stone quarries, coal or lignite veins or minerals of any kind to be found. Moose and black bear are very plentiful through this district, and are about the only kind of game to be had. Dawson trail, which passes three or four miles to the north, is the nearest trail, but there is no trail leading into the township.—*John Molloy, D.L.S., 1906.*

7.—This township may be conveniently reached by wagon road from Ste. Anne station on the Canadian Northern railway, from which place it is distant by trail about thirty-five miles. The road leading from Ste. Anne is that known as the old 'Dawson road,' and is well travelled as far as Brokenhead river, a distance of about sixteen miles. The township may also be reached by a wagon road from Bedford, another station on the same railway, and the distance from this point is somewhat less, though Ste. Anne is probably the better supply station. The soil of this township is composed chiefly of black muck on the surface of the low lands with sandy subsoil, and upon the higher portions which are characterized as jackpine ridges both surface and subsoil are composed of sand, in some places, particularly in the north-western part of the township toward the banks of Brokenhead river—mixed with gravel and boulders. This river cuts through sections 5, 8, 7 and 31, whilst a small tributary of the same traverses sections 3, 10, 9 and 8, affording a good outlet for drainage, but until artificial drainage is employed to supplement the natural system but little of this township will be suited for agricultural purposes. The higher portions composed of sandy ridges may be suitable for the growing of root crops—such as potatoes. Almost the entire surface of this township is covered by a growth of small but in most places dense timber, no prairie being found. The timber of this township is of comparatively little value, fire having destroyed the forest not very many years ago. The existing forest is, therefore, largely composed of young trees entirely too small for milling purposes—except in spots where the fire had not reached. The several varieties of timber growing upon this township are given below in the order of their abundance: black spruce, jackpine, white poplar, tamarack, willow, alder, cedar, birch, ash, elm and balsam. A very limited amount of hay is found upon this township, as the surface is almost entirely covered by timber and scrub. Small hay marshes occur, however, upon the following sections: 5, 6, 23, 24, 25, 26, 27, 28, 31, 32, 33 and 36. This township is fairly well supplied with fresh water by Whitemouth river, which flows through sections 5, 8, 7 and 31, by a small tributary of the same which traverses sections 3, 10, 9 and 8, and by two small fresh

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Range 12—Continued.

water lakes occupying a large part of section 27. In addition to these supplies good water may be found almost any place throughout the township by sinking wells to a depth of only a very few feet. It was from such latter source that I supplied my camp with water during the prosecution of survey, the season having been an unusually dry one. Whitemouth river, which in this township has a current of only about one mile an hour, is not capable of producing any significant water-power. Besides the volume of the stream in this locality is quite small. The locality of this township being so near Winnipeg, the climatic conditions are similar, very cold in winter, hot in summer and subject to very sudden changes of temperature. This township being thickly wooded with various kinds of timber, possesses an abundant supply of fuel in that form. No coal is known to exist in the locality. No stone quarries are known to occur upon the township. No minerals of economic value are known to occur upon the township. Large game, particularly moose, were observed to be common in this township and vicinity. White-tailed or jumping deer, black bears, lynx, wildcats, foxes and porcupines were also met with and are common in the district. Very few water fowl were seen, but ruffed grouse and spruce grouse were plentiful throughout the woods, and a few prairie hens were seen in the vicinity. Whitefish, pickerel and pike as well as some other varieties of good fish are found in more or less abundance in the waters of Whitemouth river.—*J. W. Tyrrell, D.L.S., 1906.*

12.—Nearly all the land in this township that is not in the muskeg is of first-class quality, being either a sandy or black loam with a clay subsoil. The soil in the muskeg is black and would make excellent hay land if drained. The greater part of the northwestern part of the township consists of muskeg and swamp which is covered for the greater part with water averaging about one foot deep in the spring of the year. Bog river, a stream about thirty-five feet wide and ten feet deep, enters the township in section 2 and flows northwesterly up to the southwest quarter of section 14, where it loses itself and spreads out into muskeg. The portion of the township which does not consist of open muskeg is covered with bush consisting of spruce and poplar averaging eight inches diameter, and thick scrub, brulé and windfall. There is considerable hay to be found along the edge of the muskeg and banks of the river. The water is all first-class in the river and muskeg, as well as what can be had by digging from five to eight feet. There are no water-powers to be had. The climate is the general Manitoba climate, without any summer frosts. Fuel is very plentiful in this district, consisting of spruce, poplar and tamarack. There are no stone quarries, coal or lignite veins to be found. A few surface stones are to be found on sections 30 and 25. Game, consisting of moose, black bear and deer are very plentiful. The main line of the Canadian Pacific railway passes about two miles to the south. The village of Whitemouth is situated on section 36 in township 11, range 11, where there is a station, two general stores, postoffice, churches and school, and having a population of about four hundred people. The townships to the south and west are well settled by well-to-do settlers. A trail leading to Whitemouth enters the township in section 4.—*John Molloy, D.L.S., 1906.*

13.—Nearly all the land in this township is of third and fourth class, as it consists principally of spruce and tamarack swamps and muskegs, with low willow scrub. It is impossible to drive into the township except in the northern part along the south shore of Winnipeg river, where the land is somewhat higher and in places dry. The timber consists principally of spruce and tamarack, being from three inches to twelve inches in diameter, and in a few places in the eastern part jackpine and poplar are to be found. There is no hay to be found, but in the townships to the west and south, hay can be had in large quantities. Water, which can be obtained in almost any portion of the township, is of first-class quality. The water in Winnipeg river is of the very best. Along this river there are numerous rapids and waterfalls where

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Range 12—Continued.

thousands of horse-power can be developed. The climate is the general Manitoba climate with no indications of summer frosts. Fuel is very plentiful all through this district, consisting principally of spruce, tamarack, poplar and jackpine. There are no stone quarries, coal or lignite veins to be found, but in the north and east portions of the township surface stones are very plentiful, consisting principally of boulders. Moose is about the only game to be found. There are good trails in the township to the west leading to the village of Whitemouth on the main line of the Canadian Pacific railway situated on section 36, township 11, range 11, where there are schools, stores and postoffices.—*John Molloy, D.L.S., 1906.*

14.—The greater portion of this township is useless for farming purposes as there is scarcely any alluvial soil, nearly all the land being covered with stones and large boulders and rocks. The whole of the township is covered with bush, consisting of spruce, tamarack, poplar, jackpine, birch and underbrush, the average diameter being about eight inches and being equally distributed over the township. There is no hay land to be found in the township or in the adjoining townships. The water is all of first-class quality, both in Winnipeg river, Lee channel and the swamps. The land is not liable to be flooded. There are a number of rapids along Winnipeg river in this township, which could be utilized for water-powers and could be further developed by the construction of dams whereby thousands of horse-power would be available. The climate is the general Manitoba climate with no indications of summer frosts. Fuel, consisting of spruce, tamarack, poplar, jackpine and birch can be had in large quantities all through this district. Nearly all the township is covered with stone, consisting mostly of boulders. There are no minerals, coal or lignite veins to be found. Game, consisting of moose, deer and black bear are very plentiful. There is a corduroy road from Winnipeg river at Lac du Bonnet station on the Canadian Pacific railway, running through sections 31 and 32 of this township and then south along Pinawa channel to section 11.—*John Molloy, D.L.S., 1906.*

Range 13.

3. The west portion of the township is chiefly clay with more or less sand; the other portion is sandy soil with, in some places, a mixture of clay in the subsoil. I would not consider the soil to be suitable for agricultural purposes except for hay and oats. The surface is level and is timbered with spruce, poplar, tamarack, balm of Gilead, birch and some balsam. Sections 2, 3, 4 and 5 are very well timbered with spruce, poplar, birch, balm of Gilead and tamarack up to twenty inches in diameter, considerable of which would be suitable for lumber and timber. The northerly part of the township is covered chiefly with poplar and balm of Gilead and the swamps with spruce and tamarack four inches to ten inches in diameter. Spruce is scattered throughout the township, and in the high land is generally from eight inches to fifteen inches in diameter. There is some small cedar along Mud creek in the southwest part of the township. There are some small meadows through the township and some larger ones along the shores of Whitemouth lake towards the north part of the township. The water throughout the township is fairly good and has very little, if any, alkali. That in Whitemouth lake is not as fresh as in the sloughs and creeks. There are no water-powers in the township, as there are no streams of any size, and as the country is level. The climate is good, there being no summer frosts to damage fruit or grain. Strawberries were very abundant, growing all through the township even amongst the heavy timber. Some gooseberries, huckleberries and a few raspberries are found. Through the latter part of May and a good part of June there was considerable rain which raised the water in the swamps and creeks. During the whole summer there is sufficient rainfall for the growth of crops of any kind. Wood is very plentiful throughout the township.

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Range 18—Continued.

except on a narrow strip around Whitemouth lake. No coal or lignite veins were seen in the township. No stone quarries were met with but boulders and small stones are to be found in many places throughout the township. No minerals or mineral-bearing rocks, not even outcroppings of any kind of rocks, were seen in the township. Game, such as moose, red deer, antelope, bears, wolves, foxes and small animals, is very plentiful. Ducks and geese are very numerous on Whitemouth lake. Partridges are also plentiful.—*Lewis Bolton, D.L.S., 1906.*

4.—The soil in this township is chiefly sand with very little loam, especially on the sand ridges, which are the only high lands in the township. In the swamps and muskegs there is quite a depth of moss, the subsoil being decayed vegetable matter or peat. This township is not suitable for agricultural purposes. The township is all timbered, there being no prairie. The higher parts are timbered with jackpine and some Norway pine. The pine is from six inches to sixteen inches in diameter and is fairly good for saw-logs or building timber. In the swamps, especially north of the sand ridges, there is good timber such as spruce, tamarack, poplar, balm of Gilead and a few cedar running from six inches to twenty inches in diameter. Sections 10, 11, 12, 13, 14, 15, 16, 17 and 18 are the best timbered in the township. The north half of the township is chiefly muskeg with small spruce and tamarack and is very wet and soft. Along the north side of Whitemouth lake and along Black creek there are good meadows where considerable hay has been cut this season. There are also a few small meadows throughout the township. The water is good throughout the township and there is no alkali. Black creek is the only stream in the township. It averages from four to six feet in width and about six inches in depth, though in the latter part of the summer it is considerably less. The water is fresh. The water in the muskegs is fairly good. There is no danger of the lands being flooded in this township except in a very wet season, when the low lands bordering on Whitemouth lake might be overflowed. There are no water-powers in the township, the country being too flat, and there are no streams of any size. The climate is good. There was very little summer frost and none sufficient to damage strawberries and other wild fruits, which were very abundant. Sufficient rain fell during the summer for the growth of any crop. There is plenty of wood in the township for fuel, but no coal or lignite veins were seen. No stone quarries were seen in the township but large and small rolling stones are quite plentiful, except in the muskegs. No minerals were observed nor any mineral-bearing rocks, not even outcroppings of any kind of rock were seen in the township. Game of all kinds was very plentiful, such as moose, red deer, antelope, bears, wolves and other small animals. Geese, ducks and all kinds of water fowl and partridge were also numerous.—*Lewis Bolton, D.L.S., 1906.*

5.—The land in this township is all third class. The soil is generally a black loam, but the surface is mostly swamps and muskegs, with a few high ridges which are somewhat sandy and stony. The whole of the township is covered with bush except in a few places where there is open muskeg with low willow scrub. The timber consists principally of spruce, tamarack, cedar, poplar and jackpine equally distributed throughout the township, the average diameter being about six inches. There is no hay to be found in this township, and scarcely any throughout the district. All the water is of first-class quality, and can be found in almost any part of the township either on the surface or by digging a few feet. Whitemouth river, a stream from two feet to four feet deep and about thirty feet wide, flows through the northeast corner of this township, flowing north. The climate is the general Manitoba climate, with no indications of summer frosts. Fuel is very plentiful all through this district, con-

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 1—Continued.

sisting of spruce, tamarack, jackpine, poplar and cedar. There are no stone quarries, minerals, coal or lignite veins in this district. Moose and black bear are about the only kinds of game to be found. There are no trails running through this township except a few winter trails, and they cannot be used as they run through the muskeg and open spots.—*John Molloy, D.L.S., 1906.*

7.—This township may be reached by wagon road from Ste. Anne station, on the Canadian Northern railway, from which place it is distant about forty miles. This road leading from Ste. Anne is what is known as the old 'Dawson road,' and is well travelled as far as Brokenhead river, a distance of sixteen miles. The township may also be reached by a road from Bedford, another station on the same railway. The soil of this township is composed chiefly of sand on the higher portions, and black muck or peat in the swamps, and almost the entire township possesses a subsoil of sand and gravel. The sandy sections of the township would seem to be of little value unless for the raising of potatoes or other root crops, but the swampy lands being composed of rich black muck will when drained be suited for general agriculture. The surface of this township is only slightly rolling, and is entirely covered by a forest of various descriptions of timber. It is unbroken by the presence of lakes or streams, except in the northeast corner of section 36 by Birch river. The timber of this township is of comparatively little value, being small and unsuited for milling, with the exception of a few scattered tamarack. The various kinds found growing upon this township are as follows, named in the order of their abundance:—Black spruce, jackpine, tamarack, white poplar, willow, alder, birch, balsam, cedar, ash and elm. The surface of this township is too much wooded to afford room for much hay land, still there are several hay marshes to be found, the largest extending in an easterly and westerly direction and occupying part of sections 14, 15, 16, 21 and 22. Other smaller marshes occur upon sections 11, 12, 13, 17 and 18, 19, 20 and 24. Except in the marshes the only other surface supply of water on this township is on section 36, which is crossed by Birch river—a sluggish stream 1·34 chains wide by six feet deep, where crossed by the east boundary of section 36. Fresh water may, however, be obtained almost any place in the township by the sinking of wells to the depth of only a very few feet. No water-power is known to occur upon or close to the township. The locality of this township being so close to Winnipeg, the climatic conditions are similar, very cold in winter, hot in summer and subject to sudden changes of temperature. This township being entirely wooded with various kinds of timber, possesses an abundant local supply of fuel in that form. No coal is known to occur in the locality. Some rock exposures occur upon sections 26, 34 and 36, and these being composed of granite it is probable that some good building stone may be found. No minerals of economic value are known to occur upon this township. Large game, particularly moose, were observed to be common in this township and vicinity. White-tailed or jumping deer, black bears, lynx, wildcats, foxes and porcupines were also seen. Very few water-fowls were seen, but ruffed grouse and spruce grouse were plentiful, and a few prairie chickens were seen in the vicinity. Several varieties of fish are reported to occur in more or less abundance in the waters of Birch river.—*J. W. Tyrrell, D.L.S., 1906.*

Range 14.

3.—This township was reached by a good wagon road which runs from Woodridge, which is on the Canadian Northern railway, into townships 4, ranges 13 and 14. The northerly portion, in fact, nearly all the township outside of Whitemouth lake was either swampy or muskeg. I had to abandon my team and wagon and use boats to move my party into the township. The soil is

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 14—Continued.

clay, with very little loam on the surface. That part of the township not muskeg, had the surface burnt over some years ago, killing the timber, which was chiefly cedar in this part. There is a small depth of loam with a subsoil of clay, and it would be good for agricultural purposes. But it is too flat and not high enough above the level of Whitemouth lake, and it would be liable to be flooded in wet seasons. The surface is timbered and there is no prairie. The timber is small throughout the township, averaging four inches to six inches in diameter. In the muskegs the timber is mostly dead, and small and scrubby. There is some good cedar and tamarack along the southeast side of Whitemouth lake, but it does not extend far. There is very little hay in the township, the land being too wet and marshy. The water is fairly good and is free from alkali in the small creeks and muskegs. The creeks are merely outlets from the muskegs into Whitemouth lake. There are no water-powers in the township as the country is too flat. There is not a point in the township that we visited that would be over five feet above the spring level of the lake. While surveying the township the weather was good for the season of the year, but I would consider that the township would be subject to summer frosts on account of being so low and swampy. There is abundance of wood for fuel throughout the township. No coal or lignite veins were seen. There are no stone quarries in the township. A few boulders and rolling stones were seen along the shore of Whitemouth lake and occasionally a large one in the muskegs. No minerals or mineral-bearing rocks or outcroppings of any kind of rock were seen in the township. Game of all kinds was very plentiful in the township, such as moose, red deer, bears, wolves and small animals. Geese, ducks and other water-fowl were very numerous in Whitemouth lake, and a few partridge were seen along the shore.—*Lewis Bolton, D.L.S., 1906.*

4.—This township was reached by the wagon road leading from Woodridge into townships 4, ranges 13 and 14. This wagon road crosses a succession of sand ridges running from Woodridge station on the Canadian Northern railway, to Whitemouth lake. The soil of this township is sand with very little loam except in a few places along Whitemouth river, where there is a slight mixture of clay. The high land in the township is principally sand ridges. The balance of the township is very flat and swampy, a great deal of which is very wet muskeg. The subsoil in the swamps is generally of a sandy nature. I would not consider the soil of this township suitable for agricultural purposes. The township is timbered. There is no prairie. On the sand ridges it is chiefly jackpine. In the swamps there is some poplar, spruce and tamarack, some of which is twelve inches and fourteen inches in diameter. In the muskegs it is chiefly scrubby spruce and tamarack, a great deal of which is dead. Most of the timber in the township is small, say four inches to eight inches in diameter, suitable for fuel only. In a few spots along Whitemouth river there are some spruce, tamarack, and balm of Gilead up to twelve inches in diameter. There are a few bluffs of cedar in the muskeg. There are fine hay meadows along Whitemouth river, where a number of parties have cut large quantities to feed their cattle during the winter. The water in Whitemouth river is not first-class, but can be used for domestic purposes. In the muskegs it is fairly good. There are no streams in the township except Whitemouth river, and a branch thereof rising in sections 35 and 36. This branch is larger than the outlet of Whitemouth lake, and the water is fairly good. There are no water-powers in the township, the country being too level. The climate is good and there are no summer frosts to injure small fruits such as strawberries, gooseberries, blueberries, raspberries, &c. The rainfall was sufficient for growing crops. The latter part of May and the first half of June was very showery and cloudy, with heavy thunderstorms. Wood is

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 14—Continued.

plentiful throughout the township, but no coal or lignite veins were seen. There are no stone quarries. Some large and small boulders were met with in the muskegs and swamps and along the river banks. No minerals or mineral-bearing rocks nor outcroppings of any kind of rock were observed in the township. Game of all kinds was very plentiful, such as moose, red deer, antelope, bears, wolves and smaller animals. Ducks, geese and other water-fowl were very numerous on Whitemouth lake.—*Lewis Bolton, D.L.S., 1906.*

5.—Nearly all the soil in this township is third class, consisting mostly of a black loam with the exception of a few ridges, where a sandy loam is found. Nearly all the township is covered with a heavy bush except in the muskegs, where a low willow scrub is found. The principal timber is spruce and tamarack, and on the ridges poplar and jackpine in addition. All the timber is equally distributed throughout the township and averages seven inches in diameter. There is no hay to be found in this section of country. All the water is of a first class quality and can be obtained easily either on the surface or by digging a very few feet. Whitemouth river, which is a stream flowing north and about thirty to forty feet wide, and two to four feet deep, flows through the southwestern corner. There are no waterfalls or water-powers to be found in the township. The climate is the general Manitoba climate, without any indication of summer frosts. Fuel is plentiful, consisting of spruce and tamarack principally, and can be obtained all through the township. There are no stone quarries, minerals, coal or lignite veins to be found in this section of country. Moose and black bear are about the only kind of game to be found, and these are very plentiful. The only trails found were winter roads and only passable during the winter months owing to the muskegs and swamps.—*John Molloy, D.L.S., 1906.*

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 1.

17.—The north half of this township is chiefly high dry ground, with the exception of a marsh along the shore of Shoal lake, in section 19, and a few small marshes, which were almost dry at the time the survey was being made. It is chiefly covered with small poplar and willow with a few prairie spots. In a few places poplar up to nine inches in diameter occurs, and in the eastern part of the township considerable windfall occurs. Section 6 and a part of sections 7, 5 and 8 are timbered with poplar from four to nine inches in diameter. Shoal lake occupies part of sections 7, 18 and 19. Around the east shore of Shoal lake the soil is very wet and several open springs occur. A large swamp occupies part of sections 9, 8 and 17. There are also large wet swamps in sections 1, 2, 3 and 12. The soil in this township is chiefly black loam on a subsoil of clay, although gravel occurs in a few places, and limestone rock comes very near the surface in places. At the quarter section corner on the north boundary of section 20, for example, solid limestone was struck in the pits at a depth of five inches, and in a ditch along the road allowance on the east boundary of section 6. limestone was uncovered at a depth of about eighteen inches for a short distance. Some fencing has been done on a small scale in this township. On the northeast quarter of section 12 a few acres of excellent wheat was grown last year. Stock-raising, however, is the chief occupation of the settlers. Plenty of hay is readily obtained from the marshes which occur in the township.—*Wm. Christie, D.L.S., 1906.*

19.—This township, though stony in places, has excellent soil, and one settler stated that he had grown fifty (50) bushels of onions on a patch about fifty (50) feet square.

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'TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 1—Continued.

He assured me that all kinds of vegetables and grain do remarkably well here. There are two or three large marshes in this township which supply hay and water for the cattle.—*Geo. A. Grover, D.L.S., 1906.*

Range 2.

18.—About one-third of this township is occupied by Shoal lake, which crosses the township from north to south. Along the west boundary of the township sections 30, 19 and 18 are swampy, with bluffs of poplar and willow. Sections 7 and 6 are drier ground lightly timbered with poplar and willow, and having numerous patches of prairie and hay land. The east half of sections 6 and 7 and the fractions of sections 5 and 8 on the shore of Shoal lake have formerly been timbered with heavier timber which has been mostly destroyed by fire. Near the shore of the lake in sections 21, 20, 29 and 30 is a fringe of woods, principally poplar and cottonwood from five to ten inches in diameter, which would furnish some good building timber. All along the shore of the lake is a strip of land of varying width from which a considerable quantity of hay is obtained. A considerable quantity of hay is also obtained from marshes and prairie patches on almost every section on the west side of the lake. Of the portion of the township east of Shoal lake, approximately the north half is high, dry land. A strip along the lake varying in width from one-half to three-quarters of a mile is timbered with poplar from four to eight inches in diameter, while the remainder is covered with scrub poplar and willow, much of which has been killed by fire. A few marshes producing hay occur in this part of the township. The settlers on the northwest and northeast quarters of section 24 have begun cultivating the land to some extent and good crops of oats were grown last year. The north half of the portion of the township east of Shoal lake is lower ground and has more marshes and muskegs, open springs occurring in places. Hay is obtained from a strip of land along the shore of Shoal lake, but very little is to be obtained elsewhere in this part of the township. The soil in this township is chiefly black loam to a depth of six to eight inches on a clay subsoil. Ducks are plentiful around Shoal lake at the time the survey was being made, and deer were reported to be quite plentiful in the vicinity.—*Wm. Christie, D.L.S., 1906.*

Range 3.

19.—The township is covered chiefly with small poplar and willow with a few oak, and has numerous marshes and sloughs; most of the latter were almost dry at the time the survey was being made. The homestead land has almost all been taken up, chiefly by Icelanders who devote their attention to stock-raising and dairying. There is plenty of grazing land almost all over the township, and the marshes produce plenty of hay in a season that is not too wet to permit of its being harvested. Stock is not allowed to winter in the open air here as is done in the provinces farther west, but is stalled and fed all winter. I saw no attempt being made at grain-growing in this township. Most of the settlers grow a few potatoes and other vegetables for their own use; but beyond that nothing has yet been done towards cultivating the land. Shoal lake extends about three-fourths of the way across the township, entering at the southeast corner and extending northwest to section 29. There is a strip of good hay land of varying width almost all along the shore of this lake. There is practically no timber of any value, except for fence posts, &c., to be found in this township. A very limited amount of timber suitable for building might be obtained in different parts of the township, the best being on Oak island in Shoal lake, in sections 2 and 11. There is plenty of wood to provide fuel for the settlers' use for some time to come. The soil of the greater part of the township is black loam to a depth of from three to eleven inches on a subsoil of clay. The whole township is covered with drift boulders. Most

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 3—Continued.

of the settlers have obtained good water by digging wells, although in some wells the water is slightly alkaline.—*Wm. Christie, D.L.S., 1906.*

20.—The west half of this township contains a considerable amount of low swampy land, together with bluffs of poplar and willow. In the northwest quarter of the township some of the bluffs contain poplar up to nine inches in diameter. In the southwest quarter the timber is almost all scrub. The lakes shown on the plan in this part of the township are exaggerated. The eastern half of the township is somewhat higher and drier land, and is also covered with poplar and willow, the northeast quarter of the township being more thickly timbered than the southeast. A considerable portion of this half of the township has had the first crop of timber destroyed by fire, and the scrub poplar and willow that grew up in its place has also been partly killed by fire. The soil of this township is chiefly black loam on a clay subsoil. The settlers in this township devote their attention to stock-raising and dairying. I saw nothing being done in the way of grain growing. Ducks were plentiful here while the survey was being made, and some moose were also seen by members of the party.—*Wm. Christie, D.L.S., 1906.*

Range 4.

16.—This township can be easily reached by the Canadian Northern railway, which runs through the township. The soil is black loam with sand and gravel subsoil, and is adapted for dairying and raising cattle. The surface is level, and covered with bluffs of poplar, the trees averaging six inches in diameter. There is considerable hay in the marshes along lakes Manitoba and Francis. The water in the lakes and marshes is of excellent quality, being free from alkali and vegetable matter. There are no water-powers, minerals or stone quarries in the township. The climate is good, and there are no summer frosts. Poplar is obtained in sufficient quantities for fuel. Wild ducks and prairie chickens are numerous. There is a harbour of refuge under construction on section 15. An excavated channel connects Lake Manitoba with quite a large but shallow lake on section 15, and when that lake is dredged out small vessels will obtain refuge when required.—*W. J. Deans, D.L.S., 1906.*

19.—This township is of the same general character as township 19, range 3, but has on the whole less bush and, consequently, a correspondingly greater area of grazing and hay land. Much of the north half of the township has evidently been covered with timber, which has been destroyed by fire, and a second growth of small poplar and willow has sprung up in its place. The north half of the township has more prairie. The settlers in this township, as in township 19, range 3, devote themselves entirely to stock-raising and dairying, no attempt being made to cultivate the land beyond the growing of a few potatoes and other vegetables for their own use. A ditch has been dug across part of the township, draining into Lake Manitoba. It starts in section 16 and leaves the township at the north boundary of section 7. This drains a considerable area of marshy land, thus greatly increasing the area of grazing and hay land in its vicinity. The soil is chiefly black loam to a depth of from three to ten inches on a subsoil of clay. Good water may be readily obtained in any part of the township by digging or drilling wells.—*Wm. Christie, D.L.S., 1906.*

20.—This township is also covered chiefly with small poplar and willow, with numerous marshes, lakes and small patches of prairie. Much of the township has at one time been covered with heavier timber, which has been destroyed by fire, the present crop of small poplar and willow growing up in its place. The settlers are engaged in stock-raising and dairying. Plenty of hay is obtained almost all over the township. The lakes shown on the plan in the northeastern part of the township are

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 4—Continued.

greatly exaggerated. A considerable part of what is shown as water on the plan is in reality dry land covered with woods, while more of it is excellent hay land. The soil is chiefly black loam on a clay subsoil. It is very stony. Ducks were plentiful here while the survey was being made.—*Wm. Christie, D.L.S., 1906.*

23.—This township was reached from township 23, range 6, by my trail, which I cut along the south boundary of township 23, range 5. After entering the township in section 6, it runs northeasterly across sections 6, 7, 8, 17 and 16, and thence following the centre meridian, as closely as the nature of the ground permitted, to the north-east corner of section 33. This trail is very soft in many places. The soil is black loam to a depth of from four to ten inches. The subsoil varies from clay, clay and boulders to gravel. The best of it should grow all the cereals, but the land generally is best adapted for mixed farming. The surface is all bush, broken, however, by numerous marshes and muskegs. The marshes occupy about twenty per cent of the surface. The timber is chiefly black and white poplar and spruce. The spruce occurs (along with the poplar) almost entirely in the eastern half of the township. No good hay occurs. The marshes contain a coarse sour muskeg grass, but on account of the large amount of water in the marshes even this could not be harvested. Fresh water is everywhere abundant. No streams occur. At the time of the survey (November), all the marshes and muskegs were full of water. The climate is moderate. During the time of the survey winter set in, with a fall of fifteen inches of snow. This arrived before the frost, leaving the ground and marshes unfrozen. After a heavy frost, about November 18, the weather remained mild until the completion of the survey. Fuel is everywhere abundant. There are no stone quarries, and no minerals. The game is moose and elk.—*J. L. R. Parsons, D.L.S., 1906.*

24.—This township was reached from township 23, range 4, by my trail along the east boundaries of sections 4 and 9 to Sleeve lake, thence on the ice. The soil is chiefly black loam from four to six inches in depth on a clay subsoil. This should grow cereals, and is best adapted for mixed farming. The surface is bush, except where broken by Sleeve lake and the numerous large marshes surrounding and draining into Sleeve lake. Sleeve lake and the surrounding marsh covers the following sections: north half 8, 9, 10, 11, 15, 16, 17, 18, east half 19, 20, 21, south half 22, south half 28, south quarter 29, 30, 31 and 32. To the south and west of Sleeve lake the timber is poplar from four to fourteen inches in diameter, about fifty per cent of which has been fire-killed or has died of dry rot. To the north and east of Sleeve lake the timber is spruce and poplar in about equal quantities, running from four to twenty inches in diameter. There is a little tamarack in this part. No good hay occurs. The marshes contain a coarse sour muskeg grass, but these marshes were full of water at the time of the survey so that even this grass could not be cut. Fresh water is everywhere abundant. The marshes all contained fresh water, and Sleeve lake is fresh. The weather during the survey (November and December) was cold, often considerably below zero in the morning. Despite this the ground and marshes remained unfrozen, being protected by the deep snow which fell about the middle of November. Fuel is everywhere abundant. No stone quarries were found nor any minerals. The game is moose, elk and fish. In Sleeve lake are to be found great quantities of jackfish and a few English perch. Several half-breeds are now engaged in fishing there, and their catch included jackfish up to ten pounds in weight. These are teamed to Oak Point, a distance of forty miles, where they sell for two and one-half cents per pound.—*J. L. R. Parsons, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 5.

18.—This township is easily reached by a good trail from Oak Point, a station on the Canadian Northern railway. The soil generally is three to four inches of black loam with subsoil of clay and stones, and is suitable for cattle-raising and dairying. Bluffs of small timber, composed of oak, poplar and willow are fairly plentiful, the oak and poplar trees averaging about six inches in diameter. Hay is very plentiful in the marshes around the edge of the lake. The water in the lake and marshes is plentiful and of good quality, being free from alkali. The climate is good, there being no summer frosts. Fuel is scarce in the township, settlers having to go long distances for it. There are no water-powers, quarries or minerals in the township. Game, consisting of wild ducks and prairie chickens, is very plentiful. There are also many fish in the lake, which is a source of income to the settlers, who catch them in the winter time and carry them to Oak Point where there is a good market for them.—*W. J. Deans, D.L.S., 1906.*

19.—This township lies on the eastern shore of Lake Manitoba and is easily reached by a good trail which runs northerly from Oak Point, a station on the Canadian Northern railway. The westerly part of the township is an extensive marsh separated from the lake by a narrow sand beach; the rest of the township is broken by numerous hay sloughs. The soil generally is a black loam from six to eight inches deep with gravel and clay subsoil. There are numerous stony ridges running north parallel to the lake. The settlers are engaged in raising cattle and dairying. Some grain and vegetables are raised in some parts and appear to attain great perfection. There is quite a lot of poplar, though it is generally small. The settlers have to go a considerable distance for fuel. There are great quantities of hay along the marsh. The water in the marsh and lake appears to be good and free from alkali. Some seasons the water in the lake is so high that a large amount of the hay land is submerged. There are no streams in the township. There are no water-powers, stone quarries or minerals in the township. Game such as wild ducks and prairie chickens are plentiful and occasionally a deer is seen.—*W. J. Deans, D.L.S., 1906.*

19.—This township borders on Lake Manitoba, which takes off a portion of the southwest corner of the township, approximately in a line from the west boundary of section 18 to the north boundary of section 5. Along the shore of the lake is a strip nearly two miles in width, which is almost all marsh with tall rushes, reeds, and deep bogs. The remainder of the township also contains much marshy land, together with bluffs of poplar, oak and willow. A plentiful supply of hay is obtained from these marshes. The settlers in this township devote their attention to stock-raising and dairying. A limited quantity of timber suitable for building may be obtained in this township. The soil is chiefly black loam on a subsoil of clay. An extension of the Oak Point branch of the Canadian Northern railway is surveyed through this township.—*Wm. Christie, D.L.S., 1906.*

20.—The north half of this township is covered chiefly with poplar woods broken by marshes and small patches of prairie. Much of the first crop of timber has been destroyed by fire, and a recent growth of small poplar and willow has sprung up in its place. Where the woods have escaped destruction by fire there is timber varying in size up to ten inches in diameter. In the south part of the township, sections 3, 4, 5, 6, 7, 8, 9, 10, 15 and 16, are chiefly prairie broken by marshes, hay grounds and a few small poplar bluffs. Sections 1, 2, 11, 12, 13 and 14 have less swamp and are covered to a greater extent with scrub poplar and willow. The soil is principally black loam on a clay subsoil. There appears no reason why it should not be suitable for grain growing. Stock-raising, however, occupies the attention of the settlers at present.—*Wm. Christie, D.L.S., 1906.*

SESSIONAL PAPER No. 25b

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 6.

19.—The township is easily reached by a good trail from Oak Point Settlement on lake Manitoba. The soil is generally a black loam with stone and clay subsoil. I think it would be suitable for cattle-raising and dairying. The township is level and broken by marshes; a very extensive one lies in section 35. There are quite a number of bluffs of poplar and some oak, generally small but large enough for fencing and fuel. There are large quantities of hay in all parts of the township. The water in the marshes is fresh and good and unlimited in quantity. The climate is good and there are no summer frosts. There are no stone quarries, water-powers or minerals of any kind in the township. Game, such as wild duck abounds and there are great quantities of small wild fruit in the bluffs. The settlers are engaged in cattle-raising and dairying, and in winter do some fishing in the lake which abounds with whitefish, pickerel and jackfish. A good market is found at Oak Point for fish, which are shipped to various parts of Canada and the United States.—*W. J. Deans, D.L.S., 1906.*

20.—This township borders on lake Manitoba, about one-fifth of the township being taken off by the lake. Along the shore of the lake is a strip of marsh, much of which produces an excellent crop of hay. The remainder of the township is chiefly covered with woods, principally poplar, with a few oaks, broken by numerous marshes, muskegs and hay lands. There is plenty of timber in the township to satisfy the needs of the settlers for building purposes and for fuel. The soil is chiefly black loam on a clay subsoil. The settlers devote their attention chiefly to stock-raising and dairying, but a few attempts have been made at grain-growing in this township, apparently with success. I noted particularly an excellent crop of oats on section 20, and on section 32 an excellent crop of oats and barley was growing at the time the survey was being made. The extension of the Oak Point branch of the Canadian Northern railway also passes through this township.—*Wm. Christie, D.L.S., 1906.*

23.—This township was reached by my own trail from township 24, range 6, which enters the township from the north, at the northeast corner of section 33, and is in good condition. In the south it is entered by an old Indian hunting trail from Lundar. This trail crosses section 2. It follows the marshes and muskegs, and was very soft and wet at the time of the survey. The soil is chiefly black loam from four to ten inches on a clay subsoil. The high land would grow all the cereals but it is much broken by marshes and muskegs. The surface is all timbered but has been fire-swept recently and a great deal of the timber has been killed. Many large marshes occur in the north and west parts of the township. The timber is black and white poplar and scattered spruce from 6 to 15 inches in diameter. A great deal of it has been fire-killed and of the living poplar much of it has dry rot and is useless for lumber. Hay is not plentiful in the township. The large marshes were full of water at the time of the survey (October), and were covered with a sour muskeg grass. A few scattered hay marshes occur, however, and some good marsh grass is found to the northwest of lake No. 2, but this was too wet to cut at the time of the survey. Fresh water is everywhere obtainable in the marshes and muskegs, and on the ridges by digging a few feet. A small stream enters section 4 from the south and finds its way westward through a chain of marshes to Dog lake. No water-powers occur. The climate is moderate, with only slight frosts at the time of the survey. Fuel is everywhere abundant, in the form of standing fire-killed trees and windfall. No stone quarries or minerals were found. The game is moose, elk and duck.—*J. L. R. Parsons, D.L.S., 1906.*

24.—This township was reached by my own trail along the north boundary of section 13, township 24, range 7, thence northerly through section 19, township 24, range 6, to its north boundary, thence easterly along the north boundary of sections 20 and 21,

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 7—Continued.

thence south southeasterly across sections 22 and 15, thence south along the east boundaries of sections 10 and 3. It is a fair trail. The soil is black loam of average depth of four inches, on clay subsoil. The subsoil is, in most places, mixed with stones and boulders to such an extent that only small areas could be cultivated. The township is chiefly useful for grazing. The surface is scrubby, with scattered bluffs of poplar and spruce. Only a very small amount of timber exists in the township in the form of small scattered bluffs of poplar from one to eight inches in diameter and spruce from three to eight inches in diameter. Hay of fair quality is to be found in the numerous marshes in the township. Fresh water is everywhere obtainable in the marshes, or on the ridges by digging a few feet. No streams occur. There is no water-power available. The climate is moderate, with only a few slight frosts at the time of survey (September). Fuel is to be found throughout the township in the form of windfall and fire-killed standing poplar and spruce. No stone quarries or minerals were found. The game is moose, elk, duck and prairie chicken.—*J. L. R. Parsons, D.L.S., 1906.*

Range 7.

22.—This township is well suited for mixed farming and dairying, the soil being a rich black loam with clay subsoil. The surface of the country is gently rolling, and is well timbered with poplar, some of good size, on the ridges, and interspersed with hay meadows in the depressions. This alternation, extending as it does through the township, gives plenty of building material and fuel and good feed for stock. Game was fairly plentiful, and some of the settlers take a good many fish from lake Manitōba.—*Geo. A. Grover, D.L.S., 1906.*

23.—This township was reached from Oak Point, on the Canadian Northern railway, by the trail along the northeast shore of lake Manitoba as far as Minnewakan; thence by the old 'Indian trail' to section 9, township 22, range 7, west of the principal meridian. Both of these trails were in good condition. From this point the course is northeasterly by an old hunting trail to the northeast corner of section 16, and thence by my own trail through sections 22, 23, 26 and 35 into the southeast quarter of section 2, township 23, range 7, and thence northerly through the township. The soil is chiefly black loam of a depth of from 6 to 10 inches on a clay subsoil, and is well adapted to agricultural purposes. The presence of a large number of hay marshes makes this especially a mixed farming country. The surface is everywhere covered with bush, except where the high ground is cut by numerous narrow hay marshes and muskegs, which abound in the township. The timber is chiefly black and white poplar from six to twelve inches in diameter, with scattered spruce from six to twelve inches in diameter and a few scrubby oak. The marshes and muskegs are immediately surrounded by willow. Hay is everywhere abundant in the numerous hay marshes. It is a coarse marsh grass of fair quality. Fresh water is everywhere obtainable by digging a few feet, and was to be had in all the marshes and muskegs at the time of the survey (August). A few small streams of fresh water flow westward towards Dog lake; they frequently lose themselves in the large marshes. The land is not liable to be flooded. No water-power is available. The climate is moderate, with no frosts at the time of the survey. Fuel is everywhere to be found. At the northeast corners of sections 2 and 12, limestone was encountered in the pits six inches below the surface, apparently in place, and it was found impossible to penetrate it with pick and shovel. There are no minerals. The game is moose, elk, geese and ducks.—*J. L. R. Parsons, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 7—Continued.

24.—This township was reached from township 23, range 7, by my own trail past the northeast corner of section 35, township 23, range 7; thence northwesterly across sections 2 and 11, to the northeast corner of section 10; thence northerly along the east boundary of section 15; thence northwesterly into section 22. This trail is in fair condition. The soil is chiefly black loam of an average depth of eight inches on clay subsoil. It is, however, intermixed with numerous large stones and boulders in many places. The ridges are broken by many marshes, muskegs and hay marshes. The country is best adapted to mixed farming. The surface is partly timbered and partly scrubby. It has been swept by at least two fires since the original survey. The only large timber left occurs on the east half of sections 3 and 10, and in sections 4 and 9. This is black and white poplar from six to twelve inches in diameter. The balance of the township is covered with poplar two to six inches in diameter, willow and small scattered groves of spruce three to eight inches in diameter. There is only a small amount of good marsh hay in the township. The numerous marshes and muskegs were very wet at the time of the survey (September), and contain a coarse, sour variety of wire grass which my horses would not eat. The upland grazing is, however, good, there being a heavy growth of peavine almost everywhere on the ridges. An abundance of fresh water is everywhere available in the marshes and muskegs. No streams occur. There is no water-power available. Fire-killed standing trees and windfall afford excellent fuel throughout the township. There were no stone quarries or minerals found. The game is moose, elk and duck.—*J. L. R. Parsons, D.L.S., 1906.*

Range 10.

15.—This township may be reached by a road running east from Gladstone, a station on the Canadian Pacific railway and the Canadian Northern railway. The soil generally is black loam from four to six inches in depth, with subsoil of clay and gravel. The surface is undulating and broken by numerous sloughs and stony ridges. The settlers are principally engaged in dairying and cattle-raising, large quantities of hay being obtainable on the land adjoining Big Grass marsh. There are a few scattered bluffs of small poplar and willow in places throughout the township. Wood for fuel may be obtained in the townships fifteen to twenty miles north. Whitemud river flows through the southwest corner of the township. This stream averages about seventy-five links in width, is three feet deep and has a current of about three miles an hour. The water is fresh, good and permanent. There are no water-powers, stone quarries or minerals in the township. The climate is free from summer frosts. Game, such as wild ducks and prairie chickens, is plentiful.—*W. J. Deans, D.L.S., 1906.*

16.—This township may be easily reached by a road running east and north from Gladstone, a station on the Canadian Northern railway. Big Grass marsh occupies a considerable portion of the northwest corner of this township. The surface is undulating and covered with numerous bluffs of poplar and willow. The soil is black loam eight inches deep with clay and gravel subsoil. The settlers are largely engaged in raising cattle and dairying, there being an abundance of hay along Big Grass marsh and in the sloughs. There has been very little effort made at grain raising, but the soil would no doubt raise oats and barley. Vegetables do well. There are no summer frosts. The climate is the same as the rest of Manitoba. There are no water-powers, stone quarries or minerals. The principal fuel is wood, which is procurable in many places throughout the township. Wild ducks and prairie chickens are plentiful, as well as larger game, such as deer and elk. Water is very scarce and of a poor quality, being highly impregnated with decayed vegetable matter, although

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

cattle appear to like it and do well on it. Wild berries and plums are plentiful in the bush.—*W. J. Deans, D.L.S., 1906.*

17.—This township may be reached by a road and trail which runs east and north from Gladstone, a station on the Canadian Northern railway. Big Grass marsh occupies a considerable portion of the westerly part of the township. The surface is undulating and broken by ridges and numerous hay sloughs. There are numerous poplar bluffs throughout the township, and clumps of willow. The poplar is large enough for fuel and building purposes. The settlers are engaged in dairying and cattle-raising, there being an abundance of hay. Water is scarce, being procurable only in the sloughs, and is of poor quality, although cattle appear to thrive on it. There are no water-powers, stone quarries, or minerals. There are numerous quarter sections which would raise grain, when brought under cultivation. All kinds of vegetables do well, and are raised in considerable quantities by the settler. There are no summer frosts, and the climate is good. Wild ducks and prairie chickens are plentiful, and larger game, such as elk, moose and deer are occasionally met with.—*W. J. Deans, D.L.S., 1906.*

Range 11.

15.—This township may be reached by a good road which runs north from Gladstone, a station on the Canadian Northern and Canadian Pacific railways. The township is level. The soil is black loam averaging twelve inches in depth with clay subsoil, except the east half which is occupied by Big Grass marsh. This marsh is nearly dry in the southerly part of the township, but there are numerous ponds and soft mud flats in the northern part. There are extensive peat beds throughout the marsh, which will no doubt in time be used for fuel. Whitemud river flows through the southeast corner of the township and drains the marsh. There are a few scattered bluffs of poplar in the western part of the township, but not sufficient for fuel, which is brought in by the railway or obtained at some distance west on the Riding mountains. The township has been settled for a number of years and all available land is under cultivation or pasturage for cattle. Extensive quantities of hay are cut in the lands adjoining Big Grass marsh. Good water is not plentiful, being confined to Whitemud river, a stream about fifty links to one chain in width, and having a current of about three miles an hour. There are no stone quarries, water-powers or minerals in the township. The climate is free from summer frosts and is well adapted for growing all kinds of early vegetables. Wild ducks and prairie chickens are plentiful.—*W. J. Deans, D.L.S., 1906.*

16.—This township can be reached by a good road which runs north from Gladstone, a station on the Canadian Northern and Canadian Pacific railways. Big Grass marsh occupies the eastern half of the township. The western half is generally low level prairie, broken by numerous small hay marshes. There are a few bluffs of small poplar and willow on the west side, but the timber is large enough for fuel or for any building purposes. There are some quarter sections in the west part which are under cultivation, growing small quantities of grain and vegetables, but the principal industry of the settlers is dairying and cattle-raising. This industry is very profitable, owing to the enormous quantities of hay which grows in the township. Water is scarce, being found only in the sloughs in Big Grass marsh. The quality is such that cattle appear to thrive well on it. There are no water-powers, stone quarries or minerals. Wood for fuel is found in the townships to the north. Prairie chickens and wild ducks are moderately plentiful. The climate is good and free from summer frosts.—*W. J. Deans, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 11—Continued.

17.—This township can be easily reached by a good road which runs east from Plumas, a station on the Canadian Northern railway. Big Grass marsh occupies the eastern half of the township. The western half is undulating prairie, broken by hay sloughs, there are a number of bluffs of small poplar and willow in the west part of the township, and much larger ones north of Big Grass river, which furnish abundance of fuel for the settlers. The settlers seem to be all engaged in dairying and cattle-raising, hay being very plentiful throughout the township. Little attention is paid to the cultivation of the land, except for raising small quantities of oats and vegetables. However, there is a considerable portion of the township which would raise wheat, oats, &c. Big Grass river flows through the northern part of the township and loses itself in Big Grass marsh. This river is six to eight feet in depth, and one chain in width, with no perceptible current. The water is strongly impregnated with matter, but when boiled is good for all domestic purposes. There appears to be a sufficient quantity for all needs of the settlers. There are no water-powers, stone quarries or minerals in the township. The climate is good and free from summer frosts. Wild ducks and prairie chickens are numerous, and partridges are plentiful in the bluffs.—*W. J. Deans, D.L.S., 1906.*

18.—This township may be reached by a trail which runs easterly from Plumas, a station on the Canadian Northern railway. The surface is slightly undulating and is covered with poplar and clumps of willow. There are numerous small hay sloughs throughout the township. The soil is generally black loam with clay subsoil and is well adapted for grain-growing after the ground is cleared. The southeast corner is occupied by Big Grass marsh. The settlers are engaged in cattle-raising and dairying, there being abundance of hay in the township. Wood for fuel and building purposes is easily obtained throughout the township. The water in the sloughs is fresh and good and in sufficient quantities for the needs of the settlers. There are no water-powers, stone quarries or minerals of any description in the township. The climate is good and free from summer frosts. Wild ducks and prairie chickens are plentiful, and deer are frequently seen in the northerly portion of the township.—*W. J. Deans, D.L.S., 1906.*

Range 22.

34.—The route followed was through sections 16, 9 and 4 of township 35, range 22 and through sections 33, 34, 27 and 22 to South Duck river. The trail was very rough and through bad muskeg full of deep holes. The soil near South Duck river is fairly good and the land could be drained so that this would make good farm land. It is a loam but the subsoil is quite often rather sandy. Along the south and west side or the southwest corner some good land is found. The soil is a black loam but the surface is rather flat, so much so that the greater part of it was flooded in July. However, if this were drained it would make very good farming land and some good hay meadows. Away from the river it is nearly all swampy or muskeg and is very wet. It is of little use unless drained, which would be hard to do as the country is so flat. The surface is generally covered with scrub. Some small openings are found towards the west and south. There is no timber of any account, but a few fair-sized spruce trees, eight to ten inches in diameter are growing in the northwest corner of the township. Considerable dry standing tamarack from six to ten inches is scattered here and there over the township. Hay is fairly plentiful along the south and west sides of the township. Numerous hay meadows are found along the west side which are used by the Galicians at present. If the country were drained there would be quite large meadows available when the bush was cleared off. The hay would be only of fair quality. There are also some sloughs in the eastern part that would make hay meadows if drained. The water is all fresh and very plentiful. The only stream of any account is South

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 22—Continued.

Duck river, which is about twenty-five feet wide, two feet deep and has a current of about two miles an hour. The only wide part is where the two streams have joined about the north side of section 16; it narrows down and almost disappears in section 26. It is dammed up by beaver in several places about three feet above its usual level. The land is very liable to be flooded almost entirely except close to the wide part of the river where the banks are about five feet high and the channel is about thirty to forty feet wide. In July the greater part of the township was flooded nearly a foot deep and in some places deeper. There are no water-powers. The climate was very cold in November and December. It was 42° below zero once and often from 20° to 35° below zero. There was a great deal of snow, so much so that even, when we finished, some of the muskeg would not carry us. The frost was only in six or eight inches at the most. The only fuel is wood, but there is plenty of it and of good quality. Tamarack is the best and is scattered all over the township. No stone quarries or minerals were found. The only game seen was moose and rabbits, but there were a number of beaver in the river and the Indians were trapping lynx. The township is so flat it will not be of much use in wet years.—*W. G. McFarlane, D.L.S., 1906.*

35. The route followed into this township was from Cowan station along the south side of North Duck river by our own trail. It was rather rough on account of fallen logs, and in places it runs through grassy sloughs. We cut a road across the river in section 16 and north as far as the north chord. The river bottom has some quicksand, and the water at the ford is about three feet deep. The road north is rather rough, and when near the north chord it becomes very wet and soft, as it is all tamarack swamp. The soil is in general not very good, but there is an exception along the river. Here a good black loam and in some places a good clay subsoil is found. This would make excellent farming land. Farther back from the river it becomes very wet and swampy. Here the soil is usually a black loam about six inches deep, or the depth of the sod or moss, and usually a sandy subsoil. On some of the slight elevations covered with jackpine nothing but sand is found. Some of these parts would be too wet and others too sandy to be of much use for farming. The surface is usually scrubby, but a few large spruce and poplar trees grow along the river. In some places there is little but dry standing tamarack and windfall. The timber is chiefly spruce, with a little balsam, birch and poplar. It is from ten to twenty inches in diameter, but is not at all plentiful. It is found only near the river. Hay is fairly plentiful near the river, as there are quite a number of hay sloughs and some meadows, but these have usually considerable brush and burnt logs in them. Some of the swamps if cleared and drained would produce a considerable quantity of hay. It would be mostly of a rather coarse quality. The water is all fresh, and very plentiful and permanent. North Duck river is the only stream of any account; it is usually about thirty feet wide and on an average one and one-half feet deep. The current is about three miles an hour. It is very winding, and the banks are usually about ten feet high. Away from the river we find the country usually very level or almost flat, and nearly all of it, with the possible exception of some slight elevations covered with jackpine in sections 28 and 29, is liable to be flooded during a very wet season. The water might be about a foot deep. There are no water-powers available. The climate in October and November was very damp. We had considerable rain and a great deal of snow, some being very wet. The snowfall was so great that it kept the ground from freezing, and made it very sloppy and wet working even when comparatively frosty. The lowest temperature noted was 26 degrees below zero Fahr. Cold winds were often experienced. The only fuel found was wood. Tamarack is the best kind, and it is found in abundance over the greater part of the township. Spruce and poplar can also be had, almost anywhere. No stone quarries, and in fact very little stone of any kind was seen. No minerals were found.

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 22—Continued.

The only kind of game seen was moose and rabbits. There were also some lynx there. The township is so flat that it would be rather difficult to drain it except near the river.—*W. G. McFarlane, D.L.S., 1906.*

Range 23.

28. The route followed was almost due north from Grandview for about twelve miles, thence north and a little east going partly across country and partly following the road allowance, until we reached the south side of the township; thence by trail into it. The road was fairly good, with the exception of an occasional bad mudhole, for the first twelve miles, then it became very bad in many places. Long stretches of it are nothing but mud and water two feet deep or more, with some muskeg and a few bad creeks to cross. The trail through the township was very wet, and through a good deal of muskeg. In fact in quite a number of places we had to pack our baggage and supplies across, as the horses could scarcely get through the mud. The soil is of quite different varieties. To the south there is a great deal of muskeg and some sand, and also a few small parts of good loam. Towards the north the ground is high, and good creeks drain it. The soil there is of good quality for farming. The surface towards the south is gently rolling or flat, but at the north it is quite hilly. There is very little prairie, or in fact really none, as the open part is merely burnt off. At the south there is considerable scrub and scattered patches of spruce, tamarack and jackpine timber, but none of any great extent. Towards the north it is all heavily timbered, but will not be of use for a timber limit. There is some timber of fair size, from ten to eighteen inches in diameter. It consists of spruce, tamarack, poplar and a little jackpine, and is of fair quality but not of any great extent. Hay is very scarce and of rank slough quality. There is a little in section 10, but that is the only place noticed. Water is very abundant, and is found nearly all over the township. Much of the south part was actually flooded as well as the easterly part. In the northerly portion the water is found in good clear creeks with swift current. The water is all good and fresh, and the supply is more than sufficient and permanent. There are several good streams towards the north, not very deep or wide but with swift currents. Small water-powers might be developed from the streams to the north, but of no great value. The climate in May was usually warm, but frequent cold, windy rainstorms were experienced. No summer frosts were noticed. Fuel is very plentiful. Wood is the only kind of fuel used; it can be had almost anywhere, but is most plentiful towards the north and west where there is considerable wind-fall. No stone quarries or minerals were found, and no game was seen except rabbits, although deer tracks were noticed. It was possibly a very wet season, otherwise the south part of this township would show up to better advantage for farm land, while the north will take a great deal of work to clear it.—*W. G. McFarlane, D.L.S., 1906.*

32. The route followed from township 28, range 23, was by trail northeasterly to Ethelbert; thence northerly on the west side of the railway to Pine River station; thence westerly and a little south by trail into the township. The trail to Ethelbert was very bad; a great deal of muskeg and mudholes had to be passed through. From Ethelbert north to Pine river the trail runs along the gravel ridge and was good. Going westerly into the township it was again very bad, being nearly covered with water and swamps. The trail into the west part of the township is over some high hills and quite steep in places. The soil is of all varieties. Towards the southeast corner the land is swampy with a little loam and heavy clay subsoil. In some places there is deep muskeg. To the northeast it is usually very sandy and would not be of much use for farming. There is some very fair land, along the foot of the hills, which would make good farms, and also some towards the southwest corner of the

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 23—Continued.

township. The northern part, near Pine river is usually too rough for farm land and considerable stone and gravel is found there. The surface is all covered with scrub or timber with the exception of one or two places near the foot of the hills. In general the timber left now is not plentiful or very valuable as the best has been taken from the east and southeast parts of the township, by lumber companies. However, a few clumps of fair spruce and tamarack are scattered here and there throughout the township, leaving good timber for settlers. There is also some jackpine of fair size, but the large trees are found only in the northeast quarter of the township. Other jackpine, about three inches in diameter, is found in dense extensive groves in sections 19, 20 and 21 on top of the hills. Here the windfall is often piled fifteen feet high and so interwoven that one cannot walk through it. The high land is generally covered with jackpine, willow and poplar scrub. It is badly cut up by deep and steep ravines where the creek beds are found. Hay is not plentiful and little can be found except along the foot of the hills, and even then it is not plentiful but it is of fair quality. Very few hay sloughs were seen. Water was most plentiful and always good and fresh. The lower land was partly flooded and in the hills very many good clear little creeks were found. In the northern part of the township Pine river runs nearly across it. At times the river can be forded at the rapids without the least difficulty or danger, but an hour after a heavy rain starts it becomes a roaring torrent and is too swift to cross although even then it might not be more than four feet deep in places. The river would average about two feet deep and sixty or seventy feet wide when normal, and the current about five or six miles an hour, but when a heavy rain starts it rises rapidly to a depth of six or seven feet or even more and the current becomes much swifter. Two of my men crossed on a log one morning to dig pits on the north side of the river, but when they tried to recross an hour or two later they were unable to do so, losing their spade in the attempt. They were then obliged to walk four miles east to the railway bridge to cross it. That was all they did that day. Another day I, with three of my men, took four hours to get over. We felled tree after tree across it, but they were immediately carried off. We at last got two dry tamarack poles across and walked over on them. The river was not at its worst then. The only parts of the land liable to be flooded badly is the southeast and eastern parts. This was flooded at times about six inches deep. On the top of the hills surface water was found standing in places but was not deep. Water-power could be developed from Pine river. There are no falls, but plenty of rapids and often steep banks of considerable height. The climate was at times warm and bright and at other times cloudy, dull and very chilly. We had a good deal of rain and one or two very heavy downpours. In fact there was no lack of moisture at any time. No summer frosts were noticed, but it was very chilly at times in June. Fuel is plentiful and can be had almost anywhere in the township. Dry tamarack and spruce are the most plentiful, but there is also a good deal of poplar. No coal was found. No stone quarries or minerals were found. Bear, moose, jumping deer and rabbits were seen and a beaver dam or two were noticed. In a dry year some parts of this township might present a much better appearance, but many of the creeks were overflowing and altogether the rainfall was quite excessive when we were there.—*W. G. McFarlane, D.L.S., 1906.*

Range 25.

6. The general aspect of the country is nearly level prairie, with bluffs of poplar and willow of small size here and there. The south portion of this township is well settled up while there are only two or three ranchers living east and south of Marshy lake. The soil is of good quality with the exception of the central portion of the township, through the hills, where it is sandy. Hay is abundant in the numerous

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 25—Continued.

sloughs and marshes of this township. There are no water-powers and no mineral has been found here. There are grain elevators at every railroad station in the neighbourhood and communications with the different great centres of the West are very easy, railroads having been built in all directions through this part of Manitoba.—*J. B. Saint Cyr, D.L.S., 1906.*

24. The route for reaching this township is by trail to Mountain Gap, thence southwesterly into the mountains in section 22. This is a good road when dry but rather heavy when wet. The soil is fine black loam with clay subsoil; it is first-class farming land. The surface is gently rolling, mostly scrubby but also some prairie here and there over all the township. There is no timber of any account, except a few spruce about twelve inches in diameter, and some poplar and willow scrub. There are quite a few fairly good hay sloughs, scattered over the whole portion surveyed, but there is very little high hay meadow. The water is fresh and abundant. There are many small streams, which may dry up in summer, but one large one, Pleasant Valley creek, is about twenty-five feet wide, four feet deep and flows about four miles an hour. There is good drainage and the land is not likely to be flooded. There is a little water-power on the large creek at the rapids but no falls. The climate is cool in May, with some frosts. There was one heavy snowstorm and plenty of rain. For fuel there is plenty of dry spruce and poplar wood almost anywhere in the township. There are no stone quarries and no minerals. Game is plentiful apparently but none was seen. Plenty of moose and deer tracks were observed. These sections are well settled. There is still some first-class land unsurveyed in the western part of the township, and there is only a little timber on the northwest corner.—*W. G. McFarlane, D.L.S., 1906.*

35.—The route followed is due south from Minitonas on the road allowance to the northwest corner of section 6. It was a rather bad road as it was not graded and had some very boggy holes in it. The soil on the north side of section 6 is very wet and chiefly muskeg, but to the south side of this section and also sections 5 and 4 the soil is good for farming. The surface has some timber on section 6, chiefly spruce from ten to twenty inches in diameter, with some poplar and birch of fair size. Sections 4 and 5 are chiefly scrubby with considerable windfall and broken up by deep ravines. The timber on section 6 does not extend to the south or east sides except an occasional tree. Hay is very scarce, but some could be had if the brush was cleared out of the sloughs in sections 5 and 4. Water is very plentiful and fresh. Numerous small streams are found but none with any large volume of water. The land is well drained in most places, except the muskeg to the north of section 6. There are no water-powers. The climate (in July) was mild and damp. We had considerable rain. No summer frosts were noticed. Fuel is plentiful. Wood is the only kind but there is plenty of it and it can be had almost anywhere. No stone quarries or minerals were found and no game was seen but traces of moose and deer were noticed. The timber in section 6 is in a timber limit.—*W. G. McFarlane, D.L.S., 1906.*

Range 26.

6.—All the land is taken up in this township, and a large quantity of very good wheat has been harvested this fall there. Hay is plentiful in this township. Though the soil is a little light, oats and wheat grow well. There are no early frosts to injure the crop. No mineral of any description has been found here during the progress of the work, and there is no timber and no water-power in this township. A portion of Marshy lake occupies the greatest part of sections 24 and 25; it is very deep in some places and the bottom is a black mud. This large sheet of water will only dry up

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 26—Continued.

completely when a ditch is made from the north end of the lake running in a north-easterly direction. Thousands of wild geese were seen there every day during the latter part of October and the beginning of November. This township can easily be reached from all directions. Farmers seem to be well off, every one of them having costly buildings and a good number of cattle and horses, with modern farm implements. Every well dug around here furnishes a good supply of soft water.—*J. B. Saint Cyr, D.L.S., 1906.*

35.—The route to reach this township from Pine river follows along the ridge on the old colonization road around the east side of Duck mountain. It had been many years since this road was used, and in the meantime dry logs about fifteen inches in diameter had fallen across it in great numbers, necessitating a great deal of chopping to clear it again. Besides this there were a great many soft holes, and some of the old bridges were so rotten on the top that they had to be rebuilt before we could cross them. It took us four days to make the move. The latter part of the road runs due south on the road allowance to the sawmill on section 1, township 35, range 26; thence by a very soft log road into section 2. The soil is usually very good, being a black loam with clay subsoil. Towards the west and north of the part surveyed, and also along the south side, it would make first-class farm land, although a little heavily timbered at present. Through the centre of this part there are some muskegs and swamps, but in a dry year this would likely become fairly solid, and at any rate could be comparatively easily drained into Favel river or Minitonas creek, which have a very good fall. When drained this may make good farm land too. Hay is very plentiful in sections 10, 11, 12 and some in 2 and 3. It is rather scarce towards the west side of the township, but the greater part of what is to be found is of very fair quality. The water is all fresh and very abundant especially in the easterly part. The supply is quite sufficient and permanent. Favel river and Minitonas creek are worthy of mention. Favel river is about twenty feet wide and one foot deep, and has a current of three or four miles an hour. Minitonas creek is scarcely as large. Some of the sections, such as parts of 11, 12, 1 and 2, may be flooded at times. In fact beavers are flooding some of them now about one foot in depth. No water-powers of any great value can be obtained, but Favel river might be used for a small one, as its banks are steep at the south boundary of section 1. The climate was mild and warm, but there was considerable rain. Some days were very hot. No summer frosts were experienced during July. Wood is the only fuel, but it is plentiful in all parts of the township. No stone quarries or minerals were found. No game was seen except rabbits, but moose and deer tracks were found, and also beaver dams and freshly cut trees. The timber of value is chiefly confined to sections 1, 2 and 3, and is now a timber limit. It consists chiefly of spruce from ten to twenty inches in diameter and some birch ten inches, balsam twelve inches and poplar about ten inches in diameter. Some of it is very good. There is also some timber on the westerly part which will be good for settlers.—*W. G. McFarlane, D.L.S., 1906.*

Range 27.

6.—The eastern half of this township is nearly level prairie; it is thickly settled. The country is rolling and somewhat stony and gravelly for a mile or two adjoining the west outline.—*J. B. Saint Cyr, D.L.S., 1906.*

7.—This township can be reached by the Arcola branch of the Canadian Pacific railway which runs through it from east to west. The soil is a rich black loam. Nearly the whole of the township is under cultivation, raising the best quality of wheat. The surface is rolling and void of timber or scrub of any kind except along

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 27—Continued.

Pipestone creek which flows through the northeastern part of the township. Along its banks are some large elm and poplar. Hay is rather scarce in the township, there being only a few small sloughs in which it grows. The water in Pipestone creek is fresh and of a good quality, and the supply is permanent and sufficient for all domestic purposes. The creek averages about a chain in width and three feet in depth, and has a current of about three miles an hour. The banks are high so that the surrounding country is not flooded to any extent in the spring. There are no water-powers, stone quarries or minerals in this township. The chief fuel is coal, which is brought in by the railways. The climate is about the same as the rest of Manitoba and there are no summer frosts. Reston, a village of considerable importance, is located in section 9. A large amount of business is transacted there by the settlers, who are in a very prosperous condition owing to the exceeding richness of the soil. Game, such as wild ducks and prairie chickens, is plentiful, and Pipestone creek is widely known throughout the province as a resort for wild geese.—*W. J. Deans, D.L.S., 1906.*

Range 28.

5.—This township is easily reached by a road which runs south from Sinclair, a station on the Arcola branch of the Canadian Pacific railway. The surface is rolling. The soil, generally, is black loam, from eight to eighteen inches deep, with clay subsoil, and is well adapted for grain growing. There is no timber of any description, but a small amount of scrub grows around the sloughs. There is sufficient hay for the settlers' requirements in the numerous small sloughs throughout the township. The Canadian Pacific Railway company is constructing a branch line through the township, which was graded at the time of the survey, but no rails were laid. There are no stone quarries, water-powers or minerals in the township. Jackson creek, a small stream, flows through the southern part of the township. This stream is dry, except in places where there are a few pools. The water is good and free from alkali or minerals. Another small stream, which is also dry except in a few places, flows through the northeast corner of the township. The principal fuel is wood and coal, which is brought in from outside points to the nearest railway station. The climate is good and free from summer frosts. Wild ducks and prairie chickens are moderately plentiful.—*W. J. Deans, D.L.S., 1906.*

6.—This township may be reached by a good trail running south from Sinclair, a station on the Canadian Pacific railway. The surface of the township is rolling, void of timber or scrub of any description. The soil throughout is a black loam averaging from six to eight inches in depth with a clay subsoil. There are a few stony ridges in the township which, however, do not detract from the grain raising qualities of the land. Hay is plentiful in the numerous small sloughs throughout the township and is sufficient for the needs of all the settlers. A creek of fresh water flows southerly through the central portion of the township, entering on the north boundary of section 32 and leaving again on the south boundary of section 3. This stream expands in many places into pools where good fishing may be had, jackfish especially being very plentiful. The water is good and permanent, amply sufficient for all domestic purposes. Fuel consists of wood and coal, brought in from outside points by the railway. There are no water-powers, stone quarries, or minerals in the township. The climate is the same as the rest of Manitoba and free from summer frosts. The only game found is wild duck and prairie chicken, which are moderately plentiful.—*W. J. Deans, D.L.S., 1906.*

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 28—Continued.

7.—This township may be reached by the Arcola branch of the Canadian Pacific railway. The soil is generally a black loam with clay and gravel subsoil, and is suitable for wheat growing, large quantities of which are raised. The surface is rolling prairie void of timber or scrub. Sufficient hay for the need of the settlers is procured in the numerous sloughs throughout the township. There is a small stream of fresh water in the westerly part of the township which disappears beneath the surface in numerous places and reappears in pools. These pools, however, are not of a permanent nature and would probably disappear in dry seasons. There are no water-powers, stone quarries or minerals in the township. The climate is good and free from summer frosts. The settlers burn wood and coal, which is procured from outside points and brought in by the railway. Wild ducks and prairie chickens are moderately plentiful. There are quite a number of stony ridges throughout the township but the stones appear to be only on the surface and do not depreciate the value of the land for grain raising.—*W. J. Deans, D.L.S., 1906.*

8. This township may be reached by the Canadian Pacific railway, a branch of which runs from Reston to Wolseley. The soil generally is a deep black loam with clay subsoil. The township is rolling prairie void of timber or scrub, except a few elm and poplar which grow along Pipestone creek, a stream running through the northeastern part of the township. This stream averages from fifty to a hundred links in width, two to four feet in depth, with a current of about three miles an hour. The water is fresh and good and is also permanent and sufficient for all domestic purposes. The banks are high generally, so that only a small portion of the land in the valley would be flooded in the spring. There are no water-powers, stone quarries or minerals in the township. The climate is the same as the rest of Manitoba and free from summer frosts. The fuel consists of coal and wood brought in by the railway. Game, such as prairie chicken and wild duck, is moderately plentiful and geese in large numbers seek this part in the fall of the year. Bardell, a railway station and postoffice, is assuming considerable importance as a commercial centre.—*W. J. Deans, D.L.S., 1906.*

Range 29.

5. This township is easily reached by a road running south from Sinclair, a station on the Arcola branch of the Canadian Pacific railway. The surface is rolling and broken by numerous small sloughs. The soil is black loam from eight to eighteen inches deep with clay subsoil. There is no timber of any description, except along the south boundary, where there are a few bluffs of small poplar. This township is well adapted for the growing of grain, and the settlers are all engaged in grain growing. Two small streams flow southerly through the township. These streams at the time of survey were dry with the exception of occasional pools. The Canadian Pacific Railway company is constructing a branch of their road through this township. Hay is moderately plentiful in the numerous sloughs. Good water can be obtained at a depth of eight or ten feet by digging. There are no water-powers, stone quarries, or minerals of any description. The climate is good and free from summer frosts. The settlers are largely dependent on the railways for their supply of fuel, which is brought from outside points. Wild ducks and prairie chickens are moderately plentiful.—*W. J. Deans, D.L.S., 1906.*

6. This township may be reached by a trail which runs south from Sinclair, a station on the Canadian Pacific railway. The township is rolling prairie destitute of scrub or timber of any description. The soil generally is a black loam averaging in depth from six to eighteen inches with a clay subsoil. There are a few ridges which are inclined to be stony, but apparently these do not detract from the producing qualities of the soil, as I saw excellent wheat growing on land which was quite stony

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 29—Continued.

in places. There is sufficient hay for the settlers' requirements in the numerous small sloughs throughout the township. Jackson creek flows southerly through the centre of the township and Graham creek flows through the southwest corner. These creeks in dry seasons have no current, but consist of numerous apparently disconnected pools; the water is fresh and good and in sufficient quantities for the settlers' requirements. The principal fuel is wood and coal, which is brought in by the railway from outside points. There are no water-powers, stone quarries, or minerals in the township. The climate is the same as the rest of Manitoba, and free from summer frosts. Wild duck and prairie chicken are moderately plentiful.—*W. J. Deans, D.L.S., 1906.*

7. This township may be reached by the Arcola branch of the Canadian Pacific railway, which runs through it from east to west. The surface is rolling and broken by a number of small sloughs and stony ridges, particularly in the westerly part. The easterly part of the township is much better, and largely under cultivation, growing wheat of the best quality. A small stream runs through the township, which disappears beneath the surface in many places and reappears again in pools. The water in these pools is fresh and good, but in a very dry season would probably disappear. The settlers are principally engaged in grain growing, there not being sufficient hay to engage largely in dairying or cattle-raising. There is no wood in the township, but a few scattered clumps of willow grow around the sloughs. There are no stone quarries, water-powers or minerals. Good water may be obtained by digging to a depth of from ten to twelve feet. There are no summer frosts. Early vegetables do well and attain great perfection. Game, such as wild duck and prairie chicken, is moderately plentiful. Sinclair, a village of about one hundred inhabitants, is located on section 13. It has an elevator, three stores and a few other business places. Fuel and lumber for building purposes are brought in by the railway from outside points.—*W. J. Deans, D.L.S., 1906.*

8. This township is easily reached by a road which runs north from Sinclair, a station on the Arcola branch of the Canadian Pacific railway. The surface is rolling and greatly broken by small sloughs and hay marshes. The soil is black loam from four to eighteen inches in depth with clay and gravel subsoil. There is no timber or scrub of any description. The settlers are principally engaged in growing wheat, of which they produce large quantities of the best quality. The Canadian Pacific railway has recently constructed a line from Reston to Wolseley which runs through the northeast corner of this township. Sufficient hay is found in the numerous sloughs for all requirements of the settlers. A small stream flows through the easterly part of the township, in a southerly direction, this stream at the time of survey was dry, except for a few pools which contained good fresh water. In a dry season these pools probably would disappear; but good water can be obtained in unlimited quantities at a depth of eight or ten feet. The settlers are largely dependent on the railway for their supply of fuel, which is brought in from outside points. There are no water-powers, stone quarries, or minerals of any description. The climate is the same as the rest of Manitoba and free from summer frosts. Game, such as wild duck and prairie chicken, is moderately plentiful.—*W. J. Deans, D.L.S., 1906.*

9. This township is, for the most part, open rolling prairie. The portion, sections 24, 25, 26, 34 and 35, through which Pipestone creek passes, is much more broken and is also dotted with bluffs of poplar and willow. Numerous sloughs occur all over the township, many of which were dry at the time of survey. The soil is generally a black loam of from eight to fourteen inches in depth, with a clay subsoil, though some of the sections in the western portion are quite stony. The crops were good, both wheat and oats apparently doing well on the cultivated portion. The Wolseley

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 29—Continued..

branch of the Canadian Pacific railway crosses the township diagonally from southeast to northwest and will be in operation this fall. The townsite of Ebor, in section 15, has been laid out and several buildings are in course of construction there, among others a large grain elevator. Both the Canadian Northern railway and the Grand Trunk Pacific railway have made surveys for railways westerly to Regina through the township, but the lines are not yet finally located. Pipestone creek averages in width about one chain, about two feet in depth, with a current of about three miles an hour; the banks are high and the valley quite narrow, so that only a small portion would be inundated by the floods in the spring of the year. The water is fresh and of good quality, permanent and sufficient for all needs of the settlers. There are no stone quarries, water-powers or minerals of any kind in the township. Fuel is scarce and the settlers depend on the railway companies to bring them in wood and coal from outside points. The climate is the same as the rest of Manitoba and free from summer frosts. Prairie chicken and wild duck are numerous, and jackfish abound in Pipestone creek. Fruit, such as wild plums, saskatoon berries, raspberries and cranberries, is very plentiful. Hay is found in sufficient quantities throughout the township for the requirements of the settlers.—*W. J. Deans, D.L.S., 1906.*

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 1.

52. *North outline.*—The westerly third of this township is very rough and broken, being in the Pasquia hills. This part consists of hills and valleys, the hills being two hundred to three hundred feet above the valleys and the whole many hundreds of feet above Carrot river, which flows easterly some six miles to the north of this township. Mountain creek flows in a valley three hundred feet deep and crosses close to the northwest corner of the township. The timber is nearly all birch with poplar and spruce in less quantity. The middle third is rolling and falls rapidly to the east. The easterly third is undulating and swampy with a thick growth of spruce and tamarack. Besides Mountain creek the only other stream of any size crossing the north outline is a branch flowing northeast across section 34 to Waskwei river. The timber in this township is not generally more than ten inches in diameter.—*J. N. Wallace, D.L.S., 1906.*

53. *East outline.*—The southwesterly part of the township is in the Pasquia hills, is very rough and broken and is thickly timbred with birch, poplar and spruce. The remainder of the township is flat and swampy and near the northeast corner is all bogland or tamarack swamp.—*J. N. Wallace, D.L.S., 1906.*

54. *East outline.*—Carrot river flows northerly close to the east outline through sections 1, 12 and 13, crossing the outline three times. Along its banks the lands are heavily timbered with cottonwood and poplar with a few spruce, but back from the river there are extensive open flooded areas. Section 24 is thickly timbered with spruce eight to ten inches in diameter. Section 25 is open, wet slough land, and section 36 is also very wet with willow bushes and small tamarack.—*J. N. Wallace, D.L.S., 1906.*

55. *East outline.*—Along the east of sections 1, 12 and 13 the land is level and wet, being composed generally of tamarack bogs, although the north half of section 12 and the south half of section 13 may prove good land if drainage can ever be carried out. The north half of section 24 and all of sections 25 and 36 are generally thickly timbered with ten-inch spruce and poplar, and willow trees. A remarkable old river channel about one hundred feet wide coming up from the southwest crosses

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 1—Continued.

sections 25 and 36. It is now full of dead water, but apparently it was at one time the channel of some river. There are many such old channels in the district, to which the Indians apply the generic term 'Petabek.'—*J. N. Wallace, D.L.S., 1906.*

56. *East outline.*—Sections 1 and 12 are composed of level lands with a dense tangled growth of tall willow with bluffs of poplar. Sections 13 and 24 are generally open slough land with willow, and the south half of section 25 is thickly timbered with poplar and willow along the south bank of Saskatchewan river. Birch river crosses about the centre of section 12, and the winter mail route from Cumberland House to The Pas mission crosses the east of section 24.—*J. N. Wallace, D.L.S., 1906.*

Range 2.

52. *North outline.*—The whole of this township is in Pasquia hills. It is all rough broken country. The hills are two hundred to three hundred feet above the valleys and the whole area is from nine hundred to fourteen hundred feet above Carrot river, which flows easterly some six miles to the north of this township. The timber is dense and consists of birch, poplar and a few spruce. Fully three-quarters of the timber is birch. The township is altogether too rough for settlement. There is probably no grass in these hills.—*J. N. Wallace, D.L.S., 1906.*

Range 3.

44. *Section 28.*—The route to this section is along the Prince Albert branch of the Canadian Northern railway to Etoimami, a small station on this line, thence south along a 'tote' road used by lumber camps in the vicinity. Said road crosses the 12th base line about one and one-half miles south of the railroad at this point. The soil is generally very sandy and of poor quality, with a substratum of alluvial gravel. There are patches of good black mud in the swampy parts, but these would have to be drained. The surface is wholly covered with scrub, poplar and spruce, and is generally undulating and facile for roads. The greater part of the section is covered with small scrub pine. The spruce is small and of little value. The timber on the east half of the section is mostly small scrub pine. The southwest quarter is a willow swamp with patches of poplar. Along the banks of Red Deer, Etoimami, and Fir rivers are dense willow with poplar and a few spruce and birch. There is no hay. The water of the three rivers mentioned is fresh and of excellent quality, and the supply appears to be permanent. Red Deer river is about six feet deep and two hundred and fifty feet wide, with a fairly swift current, and the Etoimami is two hundred feet wide and about the same depth. Fir river is one hundred feet wide and about four feet deep. The volume of water will vary according to the season, and in the Fir may dwindle down to a mere stream. There is little possibility of floods as the banks are high. There are no falls, but water-power could be developed by damming. The general indications are that the summers are hot, with probably early fall frosts. The winters are bearable, as good shelter is afforded by timber. There are no indications of coal deposits. Settlers must rely upon the timber for fuel, which for this purpose is fairly plentiful. There are no stone quarries, but there is alluvial gravel throughout the section. No minerals occur. The game consists of rabbits and partridge, with a few ducks and geese.—*R. J. Jephson, D.L.S., 1906.*

52. *North outline.*—The northwest quarter of this township is hilly, being on the lower slopes of the Pasquia hills. The remainder is in the hills, and is very rough and broken, being composed entirely of hills and valleys. The whole is thickly timbered with birch, spruce and poplar, and is too rough for settlement. It is probable that there is absolutely no grass in these hills.—*J. N. Wallace, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 4.

52. *North outline.*—Carrot river flows north across the middle of section 34. The part of the outline west of this river is entirely across sloughland, all more or less flooded. The land is quite useless until some system of drainage on a large scale lets the water off the surface into either Carrot river or Sipanok channel, when the soil would probably be found to be very good. Such a scheme is undoubtedly feasible at some future time when this district becomes more settled. The east half of the outline is in a timbered district. The land is here marshy, and irregularly covered with patches of spruce, poplar, willow and tamarack. A large stream, called Rice river, flows westerly along the eastern portion of the outline, coming from Pasquia hills and flowing to Carrot river. It is reported to have a high waterfall some miles to the southeast.—*J. N. Wallace, D.L.S., 1906.*

Range 5.

52. *North outline.*—The line runs through an area of continuous sloughland, all more or less under water, and is quite unfit for cultivation until drained on a large scale into Carrot river, which should be a feasible operation when the progress of settlement justifies a large outlay. Carrot river is considerably lower than the standing water in the sloughland and would afford a good basis for a system of drainage. There is also Sipanok channel to the north which could be similarly utilized. The land is not swampland, or bog, but pure sloughland. Indian reserve No. 28A and the Shoal lake branch of Pas Mt. Hudson bay post, are in this township. All kinds of garden produce grow very well here. There is no summer frost.—*J. N. Wallace, D.L.S., 1906.*

Range 6.

52.—*North outline.*—The line runs entirely through an area of sloughland. Slough grass and reeds are the only vegetation, with a willow bush here and there. There is, however, a very marked belt of timber along the banks of Carrot river. This belt, about one hundred yards wide on each side, consists of comparatively dry land about fifteen feet above the level of the water in the river. It is probably to be accounted for by floods in years gone by having cast up and deposited the soil carried down by the water. The timber belt forms a very marked feature of the landscape, and serves to identify the position of the river when seen miles away. The greater part of Indian reserve No. 29A, and the Hudson bay post called Pas Mountain or Red Earth are in this township.—*J. N. Wallace, D.L.S., 1906.*

Range 7.

52. *North outline.*—Except a small poplar ridge at the east end of section 31, the whole of the lands along the north outline are more or less under water. Section 31 consists almost wholly of a very bad bog. The remaining five sections are sloughland. There is practically no vegetation over this sloughland, except long slough grass and reeds. The district is a vast slough, and is worthless until some system of drainage on a very large scale is carried out, when the soil will likely prove to be good. The easterly part of Indian reserve No. 29A is in this township. Carrot river would supply a feasible basis for drainage as it is below the level of the standing water on these lands.—*J. N. Wallace, D.L.S., 1906.*

Range 8.

52. *North outline.*—Except section 36, the whole of this north outline is across an uninterrupted series of flooded bogs, swamps and muskegs extending in all directions. There is no drainage apparent, not a single creek being crossed on the whole

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 8—Continued.

six miles of the outline. The surface is all moss-covered. Section 36 is covered with eight-inch poplar and spruce on a local ridge and is dry land.—*J. N. Wallace, D.L.S., 1906.*

Range 9.

7.—This township may be reached by a good trail from Stoughton on the Arcola branch of the Canadian Pacific railway. The soil is a black loam with clay subsoil and is well adapted for wheat growing; farmers engaged in that business raise large crops of excellent quality. The surface is rolling prairie, void of scrub or timber of any kind. There are a number of sloughs scattered throughout the township in which a considerable amount of hay is cut. In the southern part of the township there is a stream; but at the time I was there it was dry except for pools in places. The water was fresh and free from alkali. The climate is free from summer frosts. Wood for fuel or building can be obtained on Moose mountains at a distance of twenty-five miles north, and lignite is mined twenty-five miles to the south. There are no stone quarries, minerals or water-powers in the township. Game such as wild duck and prairie chicken is plentiful.—*W. J. Deans, D.L.S., 1906.*

52. *North outline.*—Section 31 is fair land, is dry and is covered with a mixed growth of large poplar and spruce. Section 32 is swampy and moss covered, with small spruce and tamarack. The easterly four miles cross an uninterrupted area of flooded bogs, muskegs and swamps extending many miles to the north and south.—*J. N. Wallace, D.L.S., 1906.*

Range 10.

52. *North outline.*—The westerly four miles are first-class land, sections 31 and 32 being covered with eight-inch poplar and sections 33 and 34 with willow trees. Except for a small poplar ridge near the northeast corner of the township, sections 35 and 36 are swamp land, covered with spruce and tamarack, but south of these sections the land improves somewhat.—*J. N. Wallace, D.L.S., 1906.*

Range 11.

52. *North outline.*—Section 31 is generally dry and rolling and is covered with light poplar. Section 32 is lower land and there is a good deal of marsh covered with willow, but there is no swamp land. Sections 33 and 34 and the west half of 35 are pure bog. Very extensive swamps stretch to the north and south. The east half of section 35 and all of section 36 is first class land with a thick growth of poplar or tall willow trees. Petaigan river flows north to the Saskatchewan across section 35. The winter mail route from Fort à la Corne to Cumberland House crosses the bogland in section 34.—*J. N. Wallace, D.L.S., 1906.*

Range 12.

52.—*North outline.*—Saskatchewan river flows for five miles almost along the north outline. All the north sections, except 36, are much broken by the river and by its channel around Birch island which last contains two or three square miles. The timber along the river is very heavy, consisting of spruce up to thirty inches and cottonwood up to four feet in diameter, but it does not extend far back from the river. The Saskatchewan varies in width near the north outline from over eight hundred yards to only two hundred and seventy-five yards. The shores are soft and muddy. The outer banks are one hundred to one hundred and seventy-five feet high. The only unbroken section along the north is section 36, which contains some good land on its east half.—*J. N. Wallace, D.L.S., 1906.*

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 13.

52.—*North outline.*—Sections 31 and 32 are the best land along the north. The remainder of the outline passes through an undulating country generally lightly timbered with willow marshes and bluffs of poplar or jackpine. The soil becomes very sandy near Saskatchewan river. The northeast corner of the township is on an island in the river. There is very little swamp land.—*J. N. Wallace, D.L.S. 1906.*

Range 14.

52. *North outline.*—Sections 31 and 32 are very sandy and are much broken by the valley of Torch river. Section 33 is better land but is a good deal broken by the same river. Section 34 is good land and is nearly open country. South of this section there is much open burnt country, with a few small poplar. Section 35 is very swampy with a wet mossy surface. Section 36 is good with a light mixed growth of willow and poplar and patches of spruce.—*J. N. Wallace, D.L.S., 1906.*

Range 15.

52. *North outline.*—The area of large timber which extends across the easterly half of range 16 ends about the middle of section 31 in this range. The outline generally runs through a rolling, partly open country, consisting of very sandy elevations covered by a few small jackpine, alternating with lower lands with small poplar and willow. Across section 36 the soil is pure sand, and is almost barren, although there is a light growth of small jackpine. Torch river, a stream one hundred and ten feet wide with a swift current and a gravel bed, rises in Candle lake and flows southerly close to the township corner. It, however, turns back and ultimately flows northeast. The central part is the best of the northerly portion of the township.—*J. N. Wallace, D.L.S., 1906.*

Range 16.

52. *North outline.*—Section 31 is swamp land with small spruce and tamarack. The west half of section 32 has a large hay meadow in which Fern creek rises, a stream which flows easterly and then southeasterly. There is heavy spruce timber on sections 33, 34, 35 and 36 especially on the west half of 36 where it runs to thirty inches in diameter. There is much fallen timber on section 34. The soil is generally second and third class across this range. A pack trail from Whitefox river to Torch river crosses section 35.—*J. N. Wallace, D.L.S., 1906.*

Range 17.

52. *North outline.*—The westerly four miles are generally covered with poplar and willow, with local tamarack swamps. Section 36 is all swamp land with a thick growth of small spruce. There is heavy poplar and spruce timber along the west of Kelsey creek, a stream which flows south to Whitefox river, through sections 35 and 36. The westerly part of this range is the best.—*J. N. Wallace, D.L.S., 1906.*

Range 18.

52. *North outline.*—The westerly three and one-half miles are covered with willow or bluffs of large poplar, and the soil is generally good. There are many willow marshes but no bogs or swamps. The remaining two and one-half miles to the east corner are very swampy, and there are extensive bogs. Only one small creek, four feet wide, flowing southeast, crosses the whole six miles. A pack trail from Whitefox river to Torch river crosses section 36.—*J. N. Wallace, D.L.S., 1906.*

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Range 19.

14. In this township I found that the lake shown on sections 3, 4, 8 and 9 is entirely dried up, and that the whole area is now a very excellent hay marsh on which hay in great quantities is being cut. The lake shown on sections 10, 11, 14 and 15 is all dried up except a pond on parts of sections 10 and 15, the area of which is about 55 acres. The balance is entirely dried up, and parts on sections 11 and 14 is also an excellent hay marsh. The eastern parts of sections 10 and 15 are covered with rank weeds. I produced the lines of the adjoining section through the lakes and dug pits in order to mark the true corners, connecting the pits on each side of the lakes by straight lines. The whole area, with the exception of the pond, would be quite available for hay land. The parts of the land in sections 10, 11, 14 and 15 could be quite easily drained by cutting a drain or ditch along the side road into the pond, which would help to keep up the supply in the pond. This pond is of great value as it is the only water that can be had for a great distance except in wells.—*James Warren, D.L.S., 1906.*

52. *North outline.*—The whole of the north outline is through coniferous timber. The lower lands are bogs and swamps; the remainder is sandy elevations covered with jackpine. Only one small creek, two feet wide and flowing southeast, crosses the whole six miles, so that the lands have no drainage. The rainfall runs into the depressions and remains there till evaporated, forming bogs and swamps. About sixty per cent is under water, more or less deep. The entire surface is moss covered. The east half of section 36 is the only poplar area, and is dry.—*J. N. Wallace, D.L.S., 1906.*

Range 20.

52. *North outline.*—The westerly four miles crosses a district entirely covered with coniferous timber, with the usual accompaniment of a mossy surface. The lower lands are tamarack bogs and spruce swamps; the rest (a few feet higher) are bluffs of small jackpine. There is a remarkably sudden change of timber in section 35, where poplar and leaf loam take the place of the coniferous trees and moss. The poplar here run to twenty inches in diameter, with much undergrowth of alders and cranberry. Only one small creek crosses the whole six miles. There is practically no slope for drainage. A pack trail (a very good one) from LaCorne to Torch river crosses section 35.—*J. N. Wallace, D.L.S., 1906.*

Range 21.

52. *North outline.*—The northwest corner of this township and the west half of section 31 come in Birchbark lake. The east half of section 31 and the west half of 32 are heavily timbered and hilly. The remainder of the outline to the northeast corner traverses some extensive swamps, the higher lands being sandy elevations with small jackpine. The surface is practically all moss covered. There are a few partially open dry areas, but they are covered with dead small timber and the soil is almost barren. Along the north outline it is a very poor district. Only one creek about six inches wide crosses the whole six miles.—*J. N. Wallace, D.L.S., 1906.*

Range 22.

50. This township lies about twenty-five miles by trail in an easterly direction from Prince Albert. It can be reached by following the Fort à la Corne trail to township 49, range 22, from there taking a branch line crossing Saskatchewan river, and entering this township in section 6. The condition of this trail is good. This township can also be reached by following the Candle lake trail to township 51, range 23 and from there taking a branch trail running in an easterly direction to section 31

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 22—Continued.

of this township. This trail is in poor condition. The western half of this township consists of a black or black sandy loam about sixteen inches deep with a sand subsoil. It should be excellent soil for mixed farming. The eastern half is composed entirely of sand. The surface is of a varied nature. From the southwest corner, extending in a northeasterly direction, is a large patch of prairie covered with scrubby poplar and willow. To the north of this, the land is more heavily timbered with poplar from two to eight inches in diameter and some willow. The eastern half is covered with jackpine, spruce and birch, interspersed with willow and jackpine scrub. The timber consists of jackpine and poplar. On sections 1, 4, 9, 10, 12, 15, 23, 24 and 25, jackpine will be found large enough for tie purposes. It averages from two to sixteen inches. The poplar is too small for building purposes. Small hay sloughs are found all over the township. On the north, from a large muskeg extending across the township, large quantities of hay of a second quality can be obtained. Water is of good quality, wherever found. The eastern half is poorly supplied with water. A large muskeg is found on the north of the township. A creek with excellent water, and which runs the entire year enters on section 7 and leaves on the south of section 5. It has steep banks about fifty-two feet high where it leaves the township. There is no water-power. The climate is mild, the first frost being noticed on August 22, while open water was frozen on November 15. Fuel in the form of dead wood is obtainable in any part of the township. No coal, stone or mineral was noticed. Prairie chickens were very numerous.—*R. H. Montgomery, D.L.S., 1906.*

50. The northwest part of this township is broken by muskeg, sand ridges and hay sloughs. It is timbered with scrub poplar and willow on the sides of the ridges and large scattered jackpine on the tops. There are several strips of tamarack swamps along the margins of the muskegs. In the southwest corner of the township the land rises to an elevation of about eighty feet above the level of Saskatchewan river. Section 6, west half of section 5, and south halves of sections 7 and 8 are high and undulating. The soil is a heavy clay loam, the subsoil being a sandy clay. There is no timber of any account on these sections, except a spruce bluff on the northeast corner of the northwest quarter of section 6, of about twenty-five acres in extent, suitable for building purposes. There is a small creek coming from a muskeg in the northwest part of the township, probably a continuation of the creek crossing through township 50, range 23. It runs in a southeasterly direction through sections 20, 16 and 5, and flows into Saskatchewan river. The northeast part of the township is level and rising gently towards the east. It is timbered with a dense growth of poplar and balm of Gilead, two to five inches in diameter. The soil is a black sandy loam with a deep deposit of vegetable mould; the subsoil is a sandy loam. The southeast part is high and undulating. Sections 1, 12 and 14 are timbered with jackpine and interspersed with poplar. Sections 2, 3, 11 and 10 are covered with a dense growth of young jackpine, there being an occasional small bluff of large jackpine, which escaped the fires that burned over this area in 1886. There is much half burned and decayed pine timber scattered over the above sections. Sections 4, 9 and the east half of 5 are covered with muskeg. This soil is for the greater part pure sand. I am of the opinion that this township should be surveyed as there is a considerable quantity of good land in the northeast part. The southeast part, being near good timber, would induce many settlers to take the land that is not highly esteemed.

GENERAL.

The six townships which I have reported, viz.: townships 51, ranges 22, 23, 24 and 25, and townships 50 ranges 22 and 23, west of the second meridian, lie in one of the choicest and most extensive valleys in Saskatchewan, being from twelve to

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

GENERAL—*Continued.*

twenty miles wide and extending east between Candle lake and Saskatchewan river to the outlet of Torch river into Saskatchewan river in township 57, range 4, west of the second meridian. Whitefox river flows through the centre of the valley from township 51, range 23, and enters Torch river twenty miles east of Candle lake. Torch river, with its increased volume, is fifty feet wide, one and a half to three feet deep, and has a stony bed; the current is also greater and is from four to six miles per hour. There are good facilities for making use of the water-power on this stream. The valley is bounded on the west by a chain of sandy hills extending north from Saskatchewan river to the second tier of sections, running east and west in township 50, range 25, and by Little Red river in township 51, range 26. On the south it is bounded by a chain of sand ridges extending from township 49, range 23, to Nipawin point, along the north side of Saskatchewan river and north from four to two miles. These hills are timbered with poplar, spruce and jackpine; on the north side it is bounded by a chain of ridges that extend from Little Bittern lake near the south boundary of township 54, range 26, then in a southeasterly direction to near the northeast boundary of township 51, range 23, and in a northeasterly direction towards Little Candle lake. There is a considerable area of good agricultural land in the broken country north of township 51, ranges 23, 24 and 25, and I am impressed that large and prosperous settlements could be established there. There are several very fine lakes which contain pickerel, pike and mullet. Moose, elk and red deer are very plentiful. There are rich deposits of marl, suitable for the manufacture of cement, distributed over the country, north and east of Little Red river and with abundance of timber, clay and water-power, there are few places where cement could be produced as cheaply. There are very heavy belts of spruce timber surrounding Birchbark, Loon and Candle lakes, which are situated in the midst of the broken area. The portions that are most densely timbered have been taken up as timber berths. These I have been informed will be operated next year, affording employment for several hundred men during the winter and sawing seasons. A branch of the valley forks off and crosses Saskatchewan river between Lobins rapid and Torch river portage, and extends in a southeasterly direction until it merges into the delta of the Saskatchewan. Sipanok channel flows from Saskatchewan river through the valley and enters Carrot river in township 53, range 2. The valley is timbered on the east side of the channel with spruce, poplar and very large birch, extending back for a distance of from three to eight miles. There is a long open space on the west side of Sipanok channel in which there is room for a large settlement. The soil is very suitable for agricultural purposes. There are narrow strips of timber at intervals, which are suitable for building purposes.—*A. L. Robertson, Forest-ranger, 1906.*

51. The topography of this township is level, with long gentle undulations, suitable for drainage. It is more densely timbered than township 51, range 23, with poplar, balm of Gilead and willow along the margins of the hay meadows. There are a few small bluffs of spruce along Whitefox river. There are long, narrow reaches of openings on the west half of the township. The east half is covered with small poplar, and a few small hay meadows in the southeast part. The soil is a rich black loam, the subsoil alternating from sandy loam to a heavy clay. Whitefox river enters the township on section 19, and a tributary stream enters on section 30. The tributary joins Whitefox river on the northwest quarter of section 20. It then flows in a southeasterly direction, passing diagonally through sections 21, 15, 13 and 12, and crossing the east boundary of the township about twenty rods north of the northeast corner of section 1. The land in this township is excellent, and where timbered would be easily cleared as the timber is small. It is well adapted for mixed farming. There are no permanent sloughs in the township.—*A. L. Robertson, Forest-ranger, 1906.*

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Range 22—Continued.

52. *North outline.*—Sections 31 and 32 are the best. These have a general growth of poplar mixed with a few spruce, and there are many willow sloughs. The remaining sections are either swampy, with tamarack or spruce, or consist of bluffs of jack-pine, and are practically all moss covered, except a narrow belt of poplar land close to the west shore of Birchbark lake. The northeast corner of the township comes in the middle of Birchbark lake. This lake is some seven miles long, north and south, and is about one and one-half to two miles wide. It empties northerly by a small stream flowing into Candle lake, which is reported to be about fifteen miles north of Birchbark lake. There are extensive swamp areas to the southwest of this lake, and some very fine timber around its southern extremity.—*J. N. Wallace, D.L.S., 1906.*

Range 23.

50. The southeastern part of this township is high land, broken by hills and ridges which are sparsely timbered with coarse cull jackpine and large scraggy poplar. The soil on the tops of the hills is sandy and on the sides is sandy clay. Some of the valleys are densely timbered with small poplar and balm of Gilead two to five inches in diameter. In other valleys there are long reaches of good hay meadows with dry, hard and even surfaces. The soil in the valleys is black sandy loam, with a sandy subsoil. The northeastern portion of the township is broken by sand ridges running east from sections 22 and 27, crossing the east boundary of the township into township 50, range 22. The hills are timbered with rough jackpine and scrub poplar. In the valleys there are hay meadows, muskegs and willow. The west half of the township is situated in a valley which runs to the outlet of Torch river. It is timbered with poplar, from two to five inches in diameter. There are open spaces here and there, which were burned over, also hay meadows. This part of the township is undulating and sloping towards the northeast. There is a small creek which flows from a muskeg in township 49, range 23, crosses the south boundary of the township on section 4 and runs in a northeasterly direction and is lost in the muskegs in the northeast part of the township. This west half of the township is well drained and dry. There are several small bluffs of spruce along the banks of the creek, suitable for building purposes. There is a good trail leading into this part of the township, which crosses section 32 from the Candle lake trail. The west half of the township is well adapted for mixed farming. The soil is a black sandy loam, with a sandy clay subsoil.—*A. L. Robertson, Forest-ranger, 1906.*

51. This township lies in a valley and is timbered with poplar and balm of Gilead, two to ten inches in diameter. Not more than ten per cent of this timber will go over six inches. There are small bluffs of spruce, suitable for building purposes, varying from one to five acres in extent scattered over the township. The township is honeycombed with openings, some being stretches of hay meadow with dry smooth surfaces. Other openings were caused by forest fires and are from ten to two hundred acres in extent, on which willow, hazel and scrub poplar are growing, interspersed with hay, peavine and vetches. The township is drained by Whitefox river, which is ten feet wide and twelve inches deep, with a current of two to three miles per hour. The river has a stony bed. The water is clear and free from alkali. The river enters the township at section 22, passing through a muskeg on this section and continuing through sections 29 and 21, then running in a southeasterly direction to the south boundary of section 23, then in a northeasterly direction through section 24, crossing the west boundary of the township on the southwest quarter of section 24. Another creek enters this township, on section 34. It is ten feet wide, twelve to eighteen inches deep, with a current of two to three miles per hour, and having good clear water and a stony bed. It flows south through the east half of section

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Range 23—Continued.

34, through section 26, then southeast to the centre of section 25, passing out of the township about twenty rods south of the northeast corner of section 25. The Candle lake trail enters the township on section 7, and continues in a northeasterly direction through sections 18 and 17 to the centre of section 20, then north through sections 20 and 32, crossing the north boundary of the township about thirty rods east of the northeast corner of section 31, leading from section 29 in an easterly direction to section 24. The soil is a deep black sandy loam with a subsoil alternating from sandy clay to heavy clay. This township is suitable for mixed farming.—*A. L. Robertson, Forest-ranger, 1906.*

51. This township lies some twenty-five miles northeast from Prince Albert. Candle lake trail passes through it, entering on the west boundary of section 7 and leaving on the north boundary of 32. This trail is very heavy and rough and the opening up of a good road is one of the first requisites of this township. The soil is composed of black loam sixteen inches deep with clay subsoil. There are occasional sand ridges towards the south of this township. The surface is covered with poplar from four to six inches in diameter and willow and large hay sloughs. This land will readily adapt itself to farming of a mixed character. On sections 25, 26, 32 and 33 scattered spruce, averaging from eight to twenty inches in diameter and on sections 9, 10, 11, 14, 15, 26 and 27, poplar eight to sixteen inches will be found. This timber should be reserved for building purposes. Large hay sloughs of good quality will be found all over the township. The water is all fresh. Beaver creek passes across the northeast corner of the township, entering on the north of section 34 and leaving on the east of section 25. Several creeks are tributaries to it. On the whole a good natural system of drainage is worked out. Beaver creek in this township is ten feet wide and one foot deep, becoming stagnant in dry seasons. Apparently in wet seasons this township has been entirely flooded. There is no water-power. The climate is mild, the first frost being observed on August 25 and the first snowfall on November 5. There is plenty of dead wood for fuel. No coal or minerals were found. Stone was found along the creek beds. Partridge, deer and moose were very plentiful. There are timber berths northeast of this township and when these are developed the settlers of this township will receive a ready market for their produce.—*R. H. Montgomery, D.L.S., 1906.*

52. *North outline.*—Sections 31 and 32 are partly covered with poplar, some of which is eight inches in diameter, and partly with willow sloughs. The soil is generally good. A well known open area called 'Whitefox plains' occurs in section 32. The road from Prince Albert to Candle lake traverses this open area, and crosses the north outline of the same section. Section 33 is marshy, with willow sloughs and some bluffs of heavy spruce. Section 34 is high land and appears to be a good section. Sections 35 and 36 are covered with small spruce and jackpine and are swampy.—*J. N. Wallace, D.L.S., 1906.*

Range 24.

50. This township can be reached by Candle lake trail, which enters it on the west boundary of section 19, and leaves it on the north boundary of section 33, being some nineteen miles northeast from Prince Albert. It can also be reached on the south by a trail which I made, leaving the Candle lake trail at the southwest corner of township 50, range 25, running due east, entering the township at the northwest corner of section 6, being some fifteen miles from town. The condition of both trails is poor. The soil is a very heavy rich black loam. The township is entirely covered by bush and scrub, consisting of poplar, spruce, tamarack and jackpine, with poplar scrub and willow. There are numerous small groves of spruce, good timber averag-

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Range 24—Continued.

ing from four to thirty inches all over the township. A large portion has already been cut for ties. In the northeast corner of the township there are immense hay sloughs, the hay being of a second class quality. On the whole the land is very low, and generally speaking under water, with the exception of that immediately adjoining Garden river, which enters the township on the west boundary of section 19, flowing southeast and leaving on the east boundary of section 1. It has good water and is about forty feet wide, four feet deep and running about two miles per hour. As the river is some ten feet below the general level of the country, most of the land can be drained by a slight amount of local improvements, such as the building of ditches. This would leave immense hay meadows of first-class soil. There are no water-powers. The climate is mild, there being considerable rainfall during June and July. There is abundance of fuel, but no mineral or stone of any description. Numerous duck, deer and moose are to be found in the township.—*R. H. Montgomery, D.L.S., 1906.*

51. This township lies in the valley, is level, and well drained by two creeks, which enter the township on the north boundary, one on section 33 and the other on section 35. They flow in a southerly direction and come together on section 15, continuing south through the fifty-mile muskeg which enters the township at section 35, then passing through sections 35, 26 and part of the west half of 14, 10 and 3. The muskeg varies from a half to one mile in width. In some places it is covered with a dense growth of willow, and can be crossed in safety with a loaded wagon at any season. At other points it is a quaking bog and unsafe to cross except in winter. The land on the east side of the muskeg is a deep rich black soil, with a sandy loam subsoil. It is timbered with poplar, balm of Gilead, a few scattered spruce and willow along the margin of the muskeg. The openings in this part are hay meadows with dry smooth surface, extending back from the edge of the muskeg, which lies lower than the land on either side, and appears to have been the bed of a very large stream or lake which had been filled up. There are no permanent sloughs in this township. In going over this township I crossed a number of dry water-courses, leading into the creeks and muskegs and from hay meadows, which accounts for the good condition of the meadow surfaces. The land west of the muskeg is level, and had been thickly timbered at one time with poplar and balm of Gilead. Forest fires burned over the area many years ago, leaving long narrow strips of timber extending from east to west, this giving the country a park-like appearance. In the open spaces willow, hazel and good hay are growing. The soil is a deep black sandy loam, except a small area in section 22 near the muskeg, and that is light sandy loam with a sandy subsoil, and a few scattered jackpine growing here and there.—*A. L. Robertson, Forest-ranger, 1906.*

52. *North outline.*—The surface is generally undulating, and the timber almost all black and white poplar, although there are a few isolated bluffs of heavy spruce, especially in the southerly parts of sections 35 and 36. There is not much open country, but quite a number of willow sloughs exist which always contain good soil. A few small creeks cross the north outline. The largest poplar, averaging ten to twelve inches, occurs in section 31.—*J. N. Wallace, D.L.S., 1906.*

Range 25.

5. This township is divided into three sections by Willowbunch lake, which extends nearly across the township from east to west, and which breaks up the township a good deal. This township is not easy of access as it is away from any of the leading trails except local trails. There is a good deal of hard soil in parts. Quite a number of

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Range 25—Continued.

sections are very good and would be adapted for grain-growing. The surface is entirely open, undulating prairie without any timber or scrub of any kind, and there are no hay lands or marshes. This will render it difficult for any settler to obtain any quantity of hay. There is very little water to be obtained in any part of the township—as the water in the lake is not suitable for use, being quite alkaline. There are a few ponds of good water in the northerly part of the township. There are no streams and consequently no mill sites. The climate indications are favourable and there are no indications of any summer frosts. Fuel is scarce, there being no timber of any size on any part of the township. Nor are there any indications of coal or lignite, and there are no stone quarries nor fixed rock of any kind. Game is scarce, almost unknown, owing to the want of shelter and water. Parts of the township would be available for settlement and ranching as there is in some places nice pasturage and grass in some of the low lands. On the whole the northern portion is better adapted for grain-growing.—*James Warren, D.L.S., 1905.*

11. The best way to reach this township is by a trail from Moosejaw. This trail is a very good one and easy to travel on as there are no bad hills or ravines on the route. The soil is generally clay, in some places very hard and gravelly. From the nature of the soil it would not be adapted to agriculture or farming, but would be more suitable for ranching as there are many ponds of good water distributed over the township and the pasturage is fairly good. The surface is hilly and rolling, in some places stony and rough. There is no timber of any kind on any part of the township, not even scrub. There are scarcely any hay lands, only in places there is some tall grass around the ponds. There are some nice ponds of good water and there is a lake partly in section 1 and one in sections 8, 9, 16 and 17, both of which are alkaline. There are no streams of water and consequently no water-powers. There is no fuel to be had in the township and fuel would have to be obtained from outside places as there are no indications of either coal or lignite. There are no indications of stone anywhere, nor are there any minerals to be found in the township. Game of all kinds is scarce, only a few ducks on some of the ponds. Taking the township as a whole it is better adapted for ranching than for any other purpose.—*James Warren, D.L.S., 1906.*

12. The route to this township is by trail from Moosejaw, which is a very good trail with no bad hills or soft places. The soil in this township is generally clay, which in places would be fairly well adapted for cultivation, and many settlers have taken up land and are settled on their homesteads. Some have very good crops where they have cultivated the land. The surface is general undulating prairie entirely free from timber of any kind, nor is there any timber near the township. There are some hay lands but of a very limited extent. There are some ponds which have good fresh water, but some of the ponds or lakes are alkaline. In sections 19 and 30 there are two good large lakes, but both are alkaline. The supply in these lakes appears to be permanent. There are no streams of any kind and consequently no water-powers. The climate appears to be good and not liable to summer frosts. There are no stones or minerals of any kind, nor does there appear to be any coal seams near the surface. Game is scarce, there being only a few ducks on the ponds. This township is fairly well adapted to farming, but on the whole, ranching would be preferable on account of the surroundings, though when the land is cultivated I have no doubt good crops will be obtained.—*James Warren, D.L.S., 1906.*

50. This township is situated about seven miles from Prince Albert, and is reached by the Candle lake trail, entering section 1 and leaving at section 24. The trail is very heavy and in poor condition. The soil is a fine, rich, black loam. The surface is entirely wooded, being covered with poplar, spruce, jackpine and willow. The

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Range 25—Continued.

poplar averages from two to eight inches. A belt of jackpine extends across the south of the township averaging from four to twelve inches. Spruce from four to twenty inches is found in small groves all over the township. Large hay sloughs are found in every portion of the township, particularly the southwest corner, the hay being of a second-class quality. The water is fresh. Garden river cuts across the northeast corner of the township entering on the north boundary of section 33 and leaving at the northeast corner of section 13. It is a stream of good water, fifty links wide, three feet deep, with a current of two miles per hour. This township, generally speaking, is under water, especially the south and west portion. This portion has no drainage and could only be drained at great cost. There is no water-power. The climate in summer has been mild. There was considerable rainfall in June and July. There have been no summer frosts up to the present time (29th August). There is an unlimited amount of fuel. No coal, stone or minerals are to be found here. Duck, deer and moose are plentiful.—*R. H. Montgomery, D.L.S., 1906.*

51. The northwest part of the township is broken by a lake which partly covers sections 31, 19, 29 and the whole of 30. The body of the lake is crescent-shaped with the discs towards the north. There are numerous small shallow lagoons surrounding the lake, from one to three feet in depth and from one to five acres in extent. They are connected with the lake by narrow channels. There is a very good hay meadow around the margin of the lake and reaching back a distance of from a half to three-quarters of a mile, on which there was cut this season about three hundred and fifty tons of hay. I am of the opinion that three thousand tons could be cut at this place, as the ground is dry, smooth, and free from hummocks and willow. Section 31 is partly broken by the lake. The balance is low, swampy, and timbered with balm of Gilead, poplar and willow. Section 32 is low, with willow bordering the sides of the dry creek bed leading from the lake into Garden river, through the southeast quarter of section 32 to the outlet on section 33. On section 28 there is a large hay meadow surrounding a long narrow slough. The hay meadow extends from the lake meadow through section 28 to near Garden river on section 27. The south half of section 28 is timbered with poplar two to five inches in diameter, and a few scattered spruce. There is a small bluff of spruce on section 29, the rest being covered with hay meadow and lake. Section 27 is all timbered with poplar. On the northwest quarter of section 21 there is a small hay meadow. The rest of the section is timbered with balm of Gilead and poplar from two to five inches in diameter, except the southeast part of the southeast quarter, which is open, the soil being black sandy loam throughout. Garden river is sixteen feet wide, from one to three feet deep, stony bed throughout its course, and its current is two miles per hour. It enters the township on the approximate location of section 33, turning in a southerly direction through section 33, northeast section 28 and southwest 27, then through the centre of sections 22, 13, 10 and 3. From section 22 extending along the stream, the land rises gently until there is an elevation varying from thirty to fifty feet above the river, continuing in undulating slopes on both sides of the stream to section 3. The high land on the west side of the river falls in a gently undulating slope until a level is reached at the west boundary of sections 16 and 8. There is a continuous open space from section 22 to south boundary of township, from half to three-quarters of a mile on each side of the river. This area was burned over several times during the past twenty years. The soil alternates from black sandy loam to heavy clay, with a sandy clay subsoil. Pea-vine, vetches and excellent ridge hay are in evidence everywhere on the open area. The river is at a low stage, and fordable at scores of places between the north and south boundaries of the township, with excellent approaches on both sides. The high land on the east side of the river between sections 22 and 23 drops almost imper-

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 25—Continued.

ceptibly towards the east boundary. There are open spaces, caused by fires some years ago, which are partly covered with willow and small poplar and hay meadows, from twenty-five to two hundred acres in extent, nicely distributed over the east half of the township. On section 25 there is a spruce bluff, about twenty acres in extent, of good building timber. There is another on section 35, of about thirty acres, suitable for building purposes. The soil alternates from black sandy loam to heavy blue clay. There is a good trail to the township, which was made some years ago from Prince Albert, through township 49, range 26, crossing Little Red river at section 22, running north to the southwest corner of township 50, continuing in a northeasterly direction to section 3, township 51, range 25, then through sections 3, 10, 15, 22 and 21 to the lake. There is also a trail branching off at section 22, fording over Garden river and continuing through sections 23 and 24; then in a northeasterly direction to Candle lake. The whole of this township is very suitable for mixed farming.—*A. L. Robertson, Forest-ranger, 1906.*

52. *North outline.*—The surface is undulating, the timber, a light growth of poplar, occurring not continuously but in patches. There is much partly open land with willow bushes and small poplar. Thick poplar occurs across the east half of section 36. The soil is generally good. There are many sloughs and hay meadows, especially on section 31. Garden river (formerly called Sucker creek) flows southerly across the township. It is fifteen feet wide where it crosses the north outline.—*J. N. Wallace, D.L.S., 1906.*

Range 26.

11. The route to this township is by trail from Moosejaw. This trail is a very good one, especially in the summer, there being no hills or any wet marshy places. The greater portion of the soil is hard clay, which is not suitable for agricultural purposes. Generally the township is better adapted for ranching than for farming, as the pasturage is fairly good, and there is plenty of water. The surface is open prairie, in many places quite hilly, and in some places quite rough. There is no timber of any kind in the township, being all quite bare. There are a few small hay marshes, but not of any extent. There are several ponds and three of them especially are large, lake Agnellice, lake Petallen and lake Freda. The water in these lakes is quite alkaline, but there is a very nice spring near the northwest angle of lake Agnellice, which is very good water. There are no streams of water in any part of the township. Fuel is entirely wanting; so much so that we had to bring our wood from Moosejaw. There are no indications of minerals, coal or stone. Game is also scarce, there being only a few ducks on the ponds or lakes. From the general features of the township it is better adapted for ranching than for any other purpose. There are no ranchers located on any part of the township, though there are many good locations as there are some ravines that would give good shelter.—*James Warren, D.L.S., 1906.*

12. The route to this township is by trail from Moosejaw. The trail is a very good one and generally level with no bad hills or marshes on the route. The greater part of the soil in this township is very hard and not in any way favourable for farming or agriculture. The land is better fitted for ranching purposes as the surface is entirely open prairie. There is no timber of any kind on any part of the township. There are some good hay lands, but of a limited extent. There are many ponds in the township, some of which are very good water, but some are quite alkaline. There are no streams of water on any part of the township and consequently no millsites or water-powers. Fuel is entirely wanting, we had to draw our wood from Moosejaw.

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Range 26—Continued.

Stone is abundant in some localities, but no quarries. There are no indications of coal in any exposure on the hills. Game is scarce, only a few ducks on the ponds being seen. There are two ranchers located on section 12 who have a very good outfit of horses and cattle, and a comfortable location.—*James Warren, D.L.S., 1906.*

51. This township lies by trail some fifteen miles north of Prince Albert. This trail follows the east bank of Little Red river and is not in good condition. The western portion of this township is covered by a light sandy loam, and the eastern half by a black loam about six inches deep with a clay subsoil. The western half along Little Red river is covered by a light poplar and willow scrub and the eastern half by poplar averaging from four to ten inches with a dense hazel underbrush. Spruce in sufficient quantity for building purposes for the settlers, will be found in sections 30, 29 and 35, averaging from four to twenty inches, but not in large quantities. Hay can be found in moderate quantities along Little Red river and around the lake which lies in the northeast corner, the shores of which are low and covered with hay. The quality is second class. All the water in this township is fresh and the supply permanent. Little Red river is a stream forty feet wide, six feet deep, with a current of two miles an hour. It enters on the west boundary of section 31 flowing south and east leaving on the south boundary of section 4. This river is used by lumber companies for driving logs. There is a lake on the southwest corner of this township, the east shore of which has a sandy beach while the west is low and marshy. There is no water-power available. The climate is mild. Dead wood can be found all over the township for fuel. There is no coal, stone or mineral to be found. Game is scarce. The provincial government is building a road due north from Prince Albert entering this township on the south boundary of section 4, making the distance to town ten miles.—*R. H. Montgomery, D.L.S., 1906.*

52. *North outline.*—This township is rolling and is generally timbered with poplar varying from two to twelve inches in diameter, with many small willow marshes. There are many small ponds and sloughs. Sections 33 and 34 are the most thickly timbered on the north outline.—*J. N. Wallace, D.L.S., 1906.*

Range 27.

7. The best route for reaching this township, distant about sixty miles southerly from Moosejaw, is by way of the trail from Moosejaw to Willowbunch. This trail is generally in good condition, though it is somewhat hilly in places. The soil is chiefly sandy clay or clay loam with a stiff clay subsoil in places and would be suitable for growing all the usual cereals and vegetables of the Northwest. The western and northern portions of this township are hilly and somewhat broken in places, but the eastern and southern portions are rolling. A small amount of scrub cherry trees in the bottoms of some deep coulees in sections 33 and 34 is the only scrub in this township. All the rest of the township is open prairie. There is no timber. Little or no hay could be cut in this township but practically the whole township is covered with a good quantity of upland grass suitable for grazing purposes. Water only slightly alkaline, can be procured in dry seasons in sections 25, 26, 28, 33 and 36. Elsewhere there is little or no water. A large spring of good water exists in the northwest quarter of section 28, but soon after leaving the spring it becomes impregnated with alkali. In the above-mentioned sections the supply of water is sufficient and permanent. A deep valley runs through portions of sections 6, 7, 8, 17, 18, 20, 28, 29 and 30. The lands in the bottom of this valley are liable to be flooded for a short time in the spring. No water-power could be generated in this township. During the early part of September when this township was subdivided, fine warm days and cool nights were experienced. There is no wood for fuel in this township. There exists a vein

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 27—Continued.

of black lignite in a valley in the northeast quarter of section 28, about ten chains in a southwesterly direction from the northeast corner of the section. The vein lies in a horizontal position, and the part that had been uncovered consisted of two veins, each about one foot thick and about six inches apart. This lignite burns freely when in large pieces, but on exposure to the atmosphere it quickly decrepitates and becomes a mass of 'slack.' A strong spring of good water comes out of this vein. In fact in this part of the district wherever coal or lignite occurs water also is to be found, and though the reverse has not been proved to be true in many cases where springs exist considerable quantities of lignite have been picked up. A considerable number of boulders and stones exists on the surface, but no stone in place was observed. No economically valuable minerals, with the exception of the above-mentioned lignite, were seen. Some antelope, a few prairie chicken, geese, ducks and rabbits were seen. *H. S. Holcroft, D.L.S., 1906.*

8. The trail from Moosejaw to Willowbunch passes through the westerly part of this township and forms the best way of getting to it. This trail is in good order but is somewhat hilly in places. The soil of this township is, generally speaking, clay. But clay loam and sandy clay appear in many places as a surface soil. In some places, particularly in the western range of sections, a layer of alkaline-impregnated earth exists at the depth of a few inches below the surface. This deposit varies in thickness from a few inches to two or three feet. Stones and gravel occur in a few places though not in large quantities. This township is well suited for grazing or general farming purposes. This township is open, rolling prairie, somewhat hilly in the eastern portion, sections 6 and 7 being the only portions that are nearly level. No timber is to be found upon this township. Hay marshes of varying size, averaging about twelve acres in area, are well distributed over the township. These marshes contain a luxuriant growth of wild hay. A good quantity of upland grass grows all over the township. There are no lakes or rivers in this township. A few sloughs occur in the northeastern portion of the township, but all the water is too alkaline for human consumption with the exception of a spring beside the Moosejaw and Willowbunch trail in the northwest quarter of section 32. This water is slightly alkaline also. It is called the 'Twenty-five-mile Spring,' being twenty-five miles northerly from Willowbunch. This spring is the only permanent drinkable water in the township. None of the land is liable to be flooded to any greater extent than is caused by the melting of the snow together with the spring rains. No water-powers occur in this township. During the first week in September, in which this township was subdivided, the weather was warm and dry with cool nights but no frosts. There is no fuel in this township, the nearest wood being about ten miles southerly in townships, 25, ranges 27 and 28, where there is some cottonwood and poplar. Lignite can be procured from a vein in township 7, range 27. No coal or lignite veins were seen in this township. No stone in place was seen in this township. No minerals of economic value were encountered. Ducks of different kinds, a few geese and some antelope were seen.—*H. S. Holcroft, D.L.S., 1906.*

52. North outline.—Sections 31, 32 and 33 are rolling with a light growth of small poplar and are good land. Section 34 is wet and swampy with tamarack. Sections 35 and 36 are dry and rolling and generally, but not heavily, timbered with poplar and willow. The land is nearly all good along this range.—*J. N. Wallace, D.L.S., 1906.*

Range 28.

7. The most accessible route to this township is from Moosejaw, about sixty miles northerly on the Canadian Pacific railway. The trail from Moosejaw to Willowbunch, which passes through section 36 of this township, is a good trail to travel on

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Range 28—Continued.

in dry weather, but is somewhat hilly for a considerable portion of its length. The soil is principally clay, varying from that to sandy clay and clay loam, and should be suitable for growing all the usual cereals and vegetables of the district. It is somewhat stony in the bottoms of the coulées. A long valley through which the Moosejaw and Willowbunch trail runs, extends along the whole length of the east outline and a 'bottom' runs along the north boundaries of sections 34, 33 and 31. Coulées run back from both sides of these 'bottoms' into the township to a distance varying from a half mile to one mile, and these make the eastern and northern portions somewhat broken. Elsewhere the township is mainly gently rolling open prairie. There is no timber in this township at all. A few scattered hay-meadows are located in this township, but very little hay can be cut. The bottom lands along the northern outline would furnish a lot of good hay if cut early in the year. A fresh water slough is to be found on the east boundary of section 13. A spring at the southeast corner of the township and a spring of only slightly alkaline water in the northwest quarter of section 35, form the only bodies of fresh water seen in this township. The north and south outlines are liable to be flooded to the depth of about two feet or so for a while in the springtime. This is the only land liable to floods. The supply of fresh water at present is permanent though hardly sufficient. No water-power can be generated. The climate is the usual climate of the district; hot days and cool nights. Summer frosts, I believe, do not often occur. During the month of September, when the township was being subdivided, the days were fine and warm and the nights moderately cool. No frost was experienced. There is no fuel in this country, but poplar can be procured in the township to the south. No coal or lignite veins were encountered. No rock in place was to be seen and no mineral of economic value. A considerable number of ducks, mostly gray, blue and green wing teal and spoonbills, were seen. A few antelope and geese were also seen. Prairie chickens and jack-rabbits were very scarce.—*H. S. Holcroft, D.L.S., 1906.*

81. This township is most easily reached by the trail from Moosejaw to Willowbunch, which passes through section 1. Moosejaw is distant about sixty-five miles northerly, and is the nearest railroad point. The Moosejaw-Willowbunch trail is in good condition, but some parts are hilly, which makes travelling difficult after rain. The soil of this township is generally a stiff clay, with patches of sandy clay and gravel. The western range of sections are nearly all of a heavy clay loam. All the soil is first class and should make good agricultural land. This township is entirely open, rolling or hilly prairie. A few hills, about sixty feet high, occur in sections 4, 5, 8, 9, 20 and 21. The remainder of the township is rolling. There is no timber at all upon this township. Small hay meadows containing a heavy growth of wild hay are to be found distributed well over the township. Lake of the Rivers, or, as it is locally called, 'River lake,' is the only permanent body of water in this township. This lake cuts off portions of sections 19, 30 and 31, but is too highly alkaline for human consumption. At present fresh water can be secured from a spring in the northeast quarter of section 35, township 7, range 28, but this supply is not sufficient. None of the land is liable to be flooded. Water-power could not be generated in this township. During the period of subdivision of this township, viz., the second week in September, the weather was warm during the day and cool at night, with a few light frosts and some rain. No fuel exists in this township. The nearest procurable wood is in township 6, in ranges 27, 28 and 29, where there is a quantity of small cottonwood and poplar. No coal or lignite deposits were seen. No stone in place nor any economically valuable minerals were seen. Considerable numbers of ducks of various species, a few antelope and jack-rabbits were the only variety of game seen.—*H. S. Holcroft, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 28—Continued.

9. The trail crossing township 11, range 28, is the best one for reaching the part of the township to the west of Lake of the Rivers. The trail running from Moosejaw to Willowbunch passes through the east part of the township. The soil is all clay, but very little is suitable for farming. The east halves of sections 29 and 32 and sections 28 and 33 are suitable for farming. The south halves of sections 2, 3 and 4 are suitable for farming. The remainder of the township is rolling and hilly, and more suitable for grazing. There is no timber in the township, but there is some scrub in coulees running back from the lake in sections 6 and 7. There are no sloughs suitable for hay, and the upland grass is short and not very thick on the ground. The water in Lake of the Rivers is slightly alkaline. There is a good fresh water slough on section 1. There is a fresh water spring in section 15, and also smaller springs along the lake shore in sections 23 and 35. There are no streams and no available water-power. Wood and coal for fuel can be procured at Willowbunch. There are no lignite or coal veins in the township. There are no stone quarries or minerals of economic value. Small game such as chickens, rabbits and foxes were quite plentiful to the west of the lake. There were large flocks of ducks, geese and pelican on the lake at the time of survey (October). No antelope were seen, but this was probably due to the fact that the grass had been burned by a prairie fire just previous to the time of survey.—*C. M. Teasdale, D.L.S., 1906.*

10. The trail from Moosejaw to Willowbunch runs through the part of the township to the east of Lake of the Rivers. The westerly part of the township is more easily reached from Wood mountain trail, in township 11, range 29. The soil to the east of the lake is mostly a sandy loam and, being very rolling, is best adapted to grazing. The soil to the west is a heavy clay, and though in most parts the country is rolling, it could be mostly brought under cultivation. There is a little willow scrub along the lake shore in sections 3, 9 and 16, but there is no timber. There is some good hay land around a slough in section 6. There are good springs near the lake shore in sections 33 and 16. There are also several springs on the east side of the lake in section 36. There are no fresh water sloughs and no creeks. There is no available water-power. We had some frosts during the survey of the township (September and October). There is a two-foot lignite vein in section 36, but it was impossible to tell what the quality of the coal was, as the surface was badly weathered out. There are no stone quarries or minerals of economic value. Small game is quite plentiful, especially in the rougher parts along the lake, there being chickens, rabbits and foxes. Geese, ducks and pelican are found in large flocks on the lake. Several large herds of antelope were seen during the survey.—*Chas. M. Teasdale, D.L.S., 1906.*

11. There is a good trail crossing the northeast of the township, which is the best way for reaching the easterly portion of the township. The portion of the township to the west and south of Lake of the Rivers is more easily reached from Wood mountain trail passing through township 11, range 29. The soil is largely clay, but in the more rolling parts and adjacent to the lake there is considerable gravel. The township as a whole is best adapted to grazing, although there are a few sections suitable for farming. There is no timber and only a few small bunches of willow scrub along the east shore of the lake. There are no natural hay lands. The water in the lake is slightly alkaline, but there are some good fresh water springs along the shore. There was no water in the sloughs at the time of survey (September). There are no streams and no available water-power. There were no indications of severe frosts at time of survey. Willowbunch is the nearest point where one can get coal and wood for fuel. There are no coal or lignite veins in the township. There are no stone quarries and no minerals of economic value are known. Game is very plentiful. Large flocks of geese, ducks and pelican are found on the lake, and foxes, coyotes, rabbits and badger are

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Range 28—Continued.

found in the hills around the lake. Several herds of antelope were seen in the township.—*Chas. M. Teasdale, D.L.S., 1906.*

52. *North outline.*—This range comprises only the fractional section 36. It extends on both sides of Little Red river. The surface is rolling and is about half prairie and half poplar and willow. Except for a small swamp area just east of Little Red river, the land is very good.—*J. N. Wallace, D.L.S., 1906.*

Range 29.

7. The trail from Moosejaw to Willowbunch passes about six miles to the eastward of this township and affords the easiest means of access to it. The Moosejaw and Willowbunch trail is a good trail but is somewhat hilly in places. The soil is clay or clay loam or sandy clay. It is somewhat light in places but should produce good crops of wheat and other cereals as well as all varieties of the vegetables of the province. Parts of sections 24, 25, 26, 35 and 36 are somewhat broken by coulées and hills. The remainder of the township is open rolling prairie. No timber at all exists. A few tons of wild hay could be cut in the southwestern portion of the township, but excellent grazing exists all over the township. A small creek bed in the north of sections 34, 35 and 36 collects and holds rain and snow water, but in the very dry season this water becomes alkaline and not fit for human consumption. A shallow lake in the southern portions of sections 1 and 2 contains water, which though alkaline may be used. Beyond some few hay-meadows which hold rain water for a short while, no water exists. The supply of water is not sufficient or permanent. No water-power could be generated. The climate is good. Summer frosts, I believe, are rare. There is no fuel in this township, but poplar may be procured in a large 'bottom' or valley about four miles southward in townships 6, ranges 29 and 30. No stone in place is to be found. No minerals of economic value were seen and no coal or lignite veins were seen. A fair number of ducks was seen, also some antelope and jack-rabbits. Coyotes, red foxes, and kit foxes were plentiful. Other game was scarce.—*H. S. Holcroft, D.L.S., 1906.*

8. The nearest railway station to this township is Moosejaw. The trail from Moosejaw to Willowbunch is at present the best route to follow in reaching this township. This trail must be left in section 1 of township 8, range 28, where a wagon road leaves the main trail and goes westerly through a valley which ends at the south of the Lake of the Rivers. This is a long narrow crooked lake with strongly alkaline water which occupies most of the two eastern ranges of sections. This trail is in good condition in dry weather, but would be heavy when wet. All this township except the part adjoining the lake has a clay loam with sandy loam and sandy clay in some places. This township is very suitable for agricultural purposes as the soil is good and the surface partly rolling. The land to the east adjoining the lake is broken by coulées which run back from the lake and the soil is rather stony and gravelly. About thirty squatters' shacks are set up in this township, mostly congregated about the centre. There is no timber or scrub in this township and only a very little hay could be cut. In the northern portion there are a few small hay-meadows on which grows a light crop of poor hay. Excellent upland grass for grazing purposes is to be had all over the township. There is no fresh water in the township, although in a valley in the southeastern portion there is a creek bed which collects the rain water, but this soon becomes alkaline. The water in the Lake of the Rivers is intensely alkaline. This lake is considerably lower than the rest of the township and is surrounded by high banks which are much broken by deep and long coulées. The lake is shallow and in many places contains a growth of rank grass. No water-power could be de-

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 29—Continued.

veloped. No coal or lignite veins are known to exist. Fuel in the shape of small poplar can be procured in township 6, range 29, about fifteen miles southerly. No stone in place exists. No minerals of economic value were seen. There are a few antelope, ducks and jack-rabbits. Prairie chickens are scarce. The small game is largely destroyed by the great number of hawks, coyotes and foxes which are found all over the township. An occasional sand-hill crane or a pelican may be seen.—*H. S. Holcroft, D.L.S., 1906.*

9. This township is most easily reached from trail in township 11, range 29. The soil is principally clay, and is mostly suitable for farming. Sections 35, 36, 25, 26 and 24 are hilly and best adapted to grazing. There is no timber or scrub. Large quantities of slough hay could be cut around the large slough in sections 26, 27, 33 and 34. Upland hay could be cut in the southwesterly part of the township, as the land is lighter and the grass much heavier than in the rest of the township. There is water in the slough in sections 33 and 34, and also in a small slough in section 26. There was no other water in the township at the time of survey (October). There are no streams and no available water-powers. There are no coal or lignite veins in the township, but there is both coal and wood at Wood mountain, in township 4, range 3, west of the third meridian. There are no stone quarries or minerals of economic value. There are a few antelope, chickens and ducks in the township.—*Chas. M. Teasdale, D.L.S., 1906.*

10. This township is reached from Moosejaw by the trail passing through township 11, range 29. The soil is mostly clay or clay loam, but is generally too rolling to make good farming lands. Sections 36, 7, 8, 9, 16, 17 and 18 are hilly and gravelly, and suitable only for grazing. The surface is all prairie, there being no scrub or timber. There is a large slough on sections 31 and 32, which was partly dry at time of survey (October), and would be good hay land. There is a smaller slough on section 3, parts of which could be cut for hay. Besides these there are numerous small sloughs all over the township suitable for hay. The upland hay is very short. There is fresh water in several sloughs. Besides the sloughs on sections 3, 31 and 32, there is water in sloughs in sections 7 and 8, and a good spring near the quarter-section on the north boundary of section 19. There are no streams and no available water-powers. Both coal and wood can be had at Wood mountain, in township 4, range 3, west of the third meridian, but there are no coal or lignite veins in the township. There are no stone quarries or minerals of economic value found in the township. Antelope, chickens and ducks are quite plentiful.—*Chas. M. Teasdale, D.L.S., 1906.*

11. The trail from Moosejaw to Wood mountain crosses the township in a southwesterly direction, entering in section 35 and leaving it in section 18. The northerly two tiers and the easterly tier of sections are inclined to be gravelly, but the remainder of the township is clay and clay loam. The northerly and easterly portions of the township are suitable only for grazing, while in the remainder there is some good farming lands. It is all open, rolling prairie, without any scrub or timber at all. There are no large hay meadows in the township, although there are a few small sloughs suitable for hay. Water is not plentiful, and at the time of survey (August) there was good water in a slough on section 23. There is a spring in section 27 on the trail. There are no permanent creeks, but in the spring there is water in the valley in sections 33, 34, 26 and 25, and in some places there is a distinct bed. There are no available water-powers. Vegetation showed no signs of frost at time of survey. Coal is mined at Wood mountain, and wood can also be obtained there. There are no coal or lignite veins known in the township. There are no stone quarries or economic minerals. Game is fairly plentiful. Several herds of antelope were seen during the survey. Chickens are quite plentiful in the rougher parts. There are large numbers of foxes and badgers.—*Chas. M. Teasdale, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 30.

6. *East outline.*—The trail from Wood mountain to Willowbunch crosses the east boundary of section 12 in this township and forms the easiest way to reach the township. The soil is mainly clay, being somewhat stony in places. It would probably grow good wheat and the usual cereals of the district. A large bottom, or valley, about one and one-half miles wide along which the Willowbunch and Wood mountain trail runs, enters the township on the east boundaries of sections 1 and 12 and passes southwesterly through the southerly portion of the township. This bottom is level and contains a large quantity of good hay. The soil here is a heavy clay. This valley contains a considerable amount of poplar up to three inches in diameter. The remainder of the township appears to be open rolling prairie, being somewhat rough in places and would make excellent grazing country. Several hay meadows are scattered throughout the township. The bottom mentioned above contains several good springs of fresh water, which are permanent and would give a good supply of water. This bottom is flooded in spring time for a while. No water-powers exist. During the month of September while this boundary was being run the climate was very mild, and only one light frost occurred. Fuel in the shape of poplar can be procured all along the Willowbunch valley in the southerly part of the township. No coal or lignite veins were seen. No bed rock was seen, and no economically valuable minerals were encountered. Antelope, ducks of various kinds, and geese were plentiful. A few prairie chicken and jack-rabbits were seen. Other game appeared to be scarce.—*H. S. Holcroft, D.L.S., 1906.*

7. The nearest trail to this township is the trail from Willowbunch to Wood mountain, which passes through township 6, in range 30. The greater part of the soil of this fractional township consists of a loam mixed with clay and sometimes with sand, and should be capable of producing good crops of all the usual cereals and vegetables of the province. The township is open rolling prairie with only a small quantity of good hay growing in some small hay marshes scattered throughout the township. Two hay marshes of considerable size are located on the east boundaries of sections 12 and 13 respectively. Water of a fair quality is found in a shallow marshy lake in the northeast portion of the township. This supply is sufficient and permanent. No water-powers exist here. The climate is the usual climate of the district—moderately equable. During the time this township was subdivided, viz., the first week in October, some frosts occurred, but the weather was pleasant. There is no fuel in this township, but fuel consisting of poplar, could be procured in a valley about four miles to the south. No veins of lignite or coal were seen. There is no rock in place and no economically valuable minerals were discovered. A good many ducks and geese were seen, also a few sand-hill cranes, swans and pelicans. Prairie chickens and jack-rabbits were scarce. An occasional antelope was seen; coyotes and foxes were plentiful.—*H. S. Holcroft, D.L.S., 1906.*

8. The trail from Moosejaw to Willowbunch passes twelve miles to the east of this township. In section 1, township 8, range 28, a well beaten trail leaves the Moosejaw and Willow bunch trail and goes westward to this township. These trails are good but parts of them are liable to be flooded in spring time. The soil is clay loam or sandy clay; it is a little light in places but should produce good crops of wheat and other cereals and all the usual vegetables of the Northwest. The surface of this fractional township is almost all level country. No timber at all is found. A small amount of hay could be cut from some small hay meadows in the northwestern portion of the township. At the time of the survey no water was found in the township. In spring time some of the depressions in the surface contain water, but during the dry season water cannot be found. None of the land is liable to be flooded except for a short time in the spring. No water-power could be developed. The

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 30—Continued.

climate is good, in summer time, hot days and cold nights. Summer frosts are rare. There is no fuel to be obtained in this township. Some small poplar can be procured in a valley about ten miles to the south. There are no coal or lignite veins and no bed rock. No minerals of economic value were seen. Some antelope and jack-rabbits were seen. Prairie chickens are very scarce on account of the great number of hawks that abound. Coyotes and foxes were numerous.—*H. S. Holcroft, D.L.S., 1906.*

9. This township is reached from Moosejaw by Wood mountain trail, which passes through township 11, range 30. The soil in the north part is a heavy clay, which turns to a clay loam in the south part. The portion north and west of sections 15, 23 and 25 is rolling and more suitable for grazing, while the part to the south is more level and suitable for farming. It is all open prairie without any timber. There are some sloughs in sections 9 and 10 suitable for hay. There is a clear fresh water lake on section 22. There are no streams or no available water-powers. Wood mountain, in township 4, range 3, is the nearest point at which wood and coal is obtainable at present. There are no stone quarries nor economic minerals in the township. Antelope are found in small herds which water at the lake. On the lake there are large numbers of ducks.—*Chas. M. Teasdale, D.L.S., 1906.*

10. This township is best reached by Wood mountain trail, which passes through township 11, range 30. The soil is mostly clay, but some lighter soil is found in section 36. The northerly halves of section 35 and section 36 are fairly level and should be good wheat land, but the remainder of the township is very rolling, and parts of sections 22, 23, 14 and 13 are hilly and inclined to be gravel instead of clay, especially on the ridges. This latter part would be more suitable for grazing than farming. There is no timber. There is one large hay meadow on section 35, which at time of survey (October) was perfectly dry. There is a large deep slough on section 12, and some small sloughs occur in sections 14 and 23. The water is all good, being practically free from alkali. There are no streams and no available water-powers. No severe frosts had occurred at the time of survey, as the grass on what had been burned in September was quite green. There is no coal or wood in the township, but both can be obtained at Wood mountain. There are no stone quarries or minerals of economic value. There are a few antelope, chickens and ducks in the township.—*Chas. M. Teasdale, D.L.S., 1906.*

11. There is a good trail running from Moosejaw to Wood mountain, which crosses the southerly portion of the township. The soil is a heavy clay, except in the northerly part of sections 35 and 36, where it is a light sandy loam. The clay soil should make good wheat growing land. The north part of the township is rolling prairie, but sections 11, 12, 1 and 2 are gently rolling prairie more suitable for farming. There is no timber in the township. There are no hay meadows. At the time of survey (September) there was no water at all in the township. There are no available water-powers. There were no indications of summer frosts. There are no coal or lignite veins in the township, but coal is mined at Wood mountain, in township 4, range 3, west of the third meridian. There are no stone quarries or minerals of economic value. Game is scarce, although at times there are a few antelope, and in the sandy portion at the north of the township there are some prairie chickens.—*Chas. M. Teasdale, D.L.S., 1906.*

14. The soil in this township is very hard and in many places stony and gravelly, and not well adapted to agriculture. There are some patches of hay land, but the hay is not very good.—*James Warren, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 1.

51. The northern fraction of this township lies some twenty-three miles from Prince Albert. It is reached by the surveyed road from Prince Albert to Sturgeon lake. This road enters the township on the south boundary of section 25 and leaves on the east boundary of section 36. Its condition is excellent. The soil is composed of clay, and in a few cases there is black loam from six to twelve inches overlying it. The southwest fraction has some rich black loam, and should prove excellent for farming of a mixed character. This township has been covered by a heavy growth of large poplar and spruce, averaging from six to twenty-four inches, but being in a timber berth the best has been taken away. What good timber is left would be difficult to obtain, owing to the rough character of the ground caused by the culls remaining. These could only be removed by bush fires. There are hay sloughs in sections 25 and 36. The quality is fair, but the quantity not extensive. Upland hay is to be found in sections 6 and 7. Water of fresh quality can be obtained in sufficient quantity in any part of the township. It is found in small creeks flowing into Sturgeon lake. This lake is an enlargement of the river of the same name. It is ten miles long and averages one-third of a mile in width. The north shore is very steep and heavily wooded. No water-power is available. The climate on the whole was mild, the first frost being on August 22nd. This township is covered by large windfall and dead wood, and fuel of this character will never be lacking. No coal or minerals were discovered. Stone and boulders were found. Game has been driven out. Whitefish and jackfish are plentiful in Sturgeon lake. The northern fraction of this township can scarcely become valuable as farming land unless the district becomes burnt over. In its present condition it is the most rough and rugged country imaginable.—*R. H. Montgomery, D.L.S., 1906.*

Range 2.

50. The northern part of this township can be reached by following the Shellbrook trail to the east boundary of this township; then going north and fording the Shell river. This trail is in good condition. The Shellbrook-Sturgeon lake trail passes through section 32. The soil is composed of black loam, six to twelve inches, with a clay or sand subsoil. It should prove a good mixed farming district. The land is lightly wooded generally with poplar, averaging from two to six inches in diameter. Sections 31 and 32 are covered by a light willow scrub. There is no timber. A little upland hay is to found in section 36. Owing to the proximity of Shell river little surface water is found, and the land is never liable to be flooded. There are no waterfalls. The climate is mild, the first frost being noticed on August 22nd. Dead wood can be obtained in abundance for fuel. No coal, minerals or stones were found. Game was very scarce.—*R. H. Montgomery, D.L.S., 1906.*

51. This township lies on the main trail to the Prince Albert Lumber company camps at Stump lake. This trail follows the Prince-Albert-to-Sturgeon lake surveyed trail to the east end of Sturgeon lake. It then follows the south shore of the lake and river, and enters the township on the east boundary of section 12, a distance in all of about thirty miles, leaving the township on the north boundary of section 31. The condition of this trail is excellent. The soil is composed of a rich black loam, generally twelve inches deep, with a clay subsoil. The land should be suitable for mixed farming. The surface is generally covered with poplar and willow. Sections 1, 12, 14, 23, 15 and 16 are covered with very light poplar and willow scrub. In the southwest and northeast corners of this township spruce averaging from four to thirty inches is found in large quantities. A considerable amount of this timber has been cut out by lumber companies. There is a large quantity of both upland and lowland hay, the upland being found in the southeast corner and the slough hay on section 10 and around lake No. 1. Water is scarce except in Sturgeon lake and river. Sturgeon

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 2—Continued.

river, one chain wide, enters on the north boundary of section 31, flows southeast to section 21, thence east to Sturgeon lake. Particulars concerning this river could not be obtained at the time of the survey, as it was dammed by the Prince Albert Lumber company, and the whole river valley was in a flooded condition. The banks of this valley are about one hundred and forty feet high, and, as numerous coulées run into it, the land will never be flooded. Sturgeon lake begins in this township; it is merely an enlargement of the river. There are no waterfalls. The climate is mild. On August 22nd the first frost was noticed. Dead wood for fuel can be obtained in abundance all over the township. There is no coal or minerals. Colour of gold can be obtained in the creek beds. Boulders were plentiful along the river valley. Game is scarce, but Sturgeon lake is teeming with white and jackfish. Several squatters were found in this township. Their chief industry is supplying hay to the lumber companies—*R. H. Montgomery, D.L.S., 1906.*

Range 3.

21. This township is about 30 miles north of Mortlach, a small town on the main line of the C.P.R., and about 35 miles west of Craik, on a branch line of the C.P.R., from which the settlers obtain building material and supplies. There are well beaten trails from both these towns to various parts of the township. The soil throughout is sandy loam, with occasional clay suitable for wheat, oats, flax and potatoes. The surface is undulating to rolling throughout. There is no timber or scrub of any description in this township. There are four small alkali lakes in sections 2, 13, 14, 15, 22 and 21. There are also several small alkali creeks in the northern half of the township. Wells are dug by settlers usually at a depth of from 30 to 70 feet, but the water is not always drinkable, owing to a strong alkali flavour. There are a few small hay sloughs in this township. Settlers obtain good hay from Qu'Appelle valley, some 10 miles to the north. From information obtained, and my experience, there are no summer frosts; on the other hand, very hot weather generally prevails during the summer months. We did not perceive any signs of coal or veins of lignite in this township, the settlers having to freight coal from Craik or Mortlach. No stone quarries were observed. A few antelopes and coyotes were seen. Our nearest postoffice was West Bridgford, situated in section 32, in the township to the north, to which the mail is brought from Craik once a week. A number of settlers were noticed building and ploughing, and from subsequent information I learned that all the homesteads were taken. Railway surveyors have laid out a trial line of the new extension line of the C.P.R. from Moosejaw to The Elbow, some six miles to the north of this township. As the settlers have generally only arrived on their homesteads this spring, the crop will not be very large, although considerable land is broken and will be ready for next spring.—*E. W. Hubbell, D.L.S., 1906.*

22. This township is about forty miles north of Mortlach, a small town on the main line of the Canadian Pacific railway, and about thirty-five miles west of Craik, on a branch line, from which the settlers obtain building material and supplies. There are well beaten trails from both these towns passing through various parts of the township. The soil throughout is sandy loam, with some clay and gravel, but on the whole is suitable for wheat, oats, flax and potatoes. The surface is undulating to rolling throughout. There is no timber or scrub of any description in this township. There is an alkali lake in sections 18 and 19, also alkali creeks in the northeast and northwest corners of the township. There is no other water. Wells are dug by settlers, and water is obtained usually at a depth of from thirty to seventy feet, but the water is not always drinkable owing to a strong alkali flavour. There are a few small hay sloughs in this township; settlers obtain good hay from Qu'Appelle valley, in the township to the north. From information obtained, and from my own experience,

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 4—Continued.

22. This township is about 45 miles west of Craik (a small but thriving town, through which a branch of the C.P.R. runs), and is reached by a well beaten trail from that place. The soil throughout is sandy loam suitable for wheat, oats, flax and potatoes, but to insure a good crop considerable rain is necessary. The surface is open and undulating throughout. There is no timber or scrub of any description in this township. Good water is scarce; there are several alkali sloughs, also two small alkali creeks, one in the northwest part, the other in the eastern part of the township. Wells are dug by the settlers, and water is generally obtained at a depth of 30 to 60 feet, but it is not always drinkable owing to it having a strong alkali taste. There is no flooded land in this township. Some of the settlers obtain good hay from Qu'Appelle valley, distant about 10 miles. From information obtained, and my experience, there are no summer frosts; on the other hand, very hot weather generally prevails during the summer months. We did not perceive any signs of coal or veins of lignite in this township, nor stone quarries. The settlers have to freight fuel from Craik or from Mortlach, situated on the main line of the C.P.R., and about forty-five miles distant. Small poplar scrub can be obtained for fuel from the sand hills some ten miles to the north. Our nearest postoffice was West Bridgford, situated in section 32, township 22, range 3, and to which the mail is brought from Craik once a week. A number of settlers were noticed at the time of survey building and ploughing, and from subsequent information I learned that all the homesteads were taken. Railway surveyors have laid out a trial line of the new extension of the C.P.R. from Moosejaw to The Elbow, some four miles to the east of this township. As the settlers have mostly only arrived on their homesteads this spring, the crop will not be very large, although considerable land is broken and will be ready for next spring.—*E. W. Hubbell, D.L.S., 1906.*

Range 5.

21. This township is about fifty miles west of Craik, a small but thriving town, through which a branch of the Canadian Pacific railway runs, and is reached by a well beaten trail from that place. The soil throughout is sandy loam, suitable for wheat, oats and potatoes, but to insure a good crop considerable rain is necessary. The surface is undulating to rolling throughout. There is no timber or scrub of any description in this township. There are a few hay sloughs, but these were dry and there were no other signs of water, other than wells dug by settlers, in this township. Water is obtained at a depth of thirty to sixty feet, but it is not always drinkable owing to a strong alkaline taste. From information obtained and my experience, there are no summer frosts; but on the other hand, very hot weather generally prevails during the summer months. We did not perceive any signs of coal or veins of lignite in this township, nor stone quarries, the settlers having to freight fuel from the nearest station, which is Chaplin, situated on the main line of the Canadian Pacific railway, and about thirty-five miles distant. The only game is a few antelope in the southern part of the township. Our nearest postoffice was Log Valley, situated in section 34, township 20, range 8, and to which the mail is brought a distance of thirty-five miles from Herbert, on the main line of the Canadian Pacific railway, once a week. A number of settlers were noticed at time of survey, building and ploughing, and from subsequent information I learned that all the homesteads were taken. The lack of water is the great drawback of this section of the country. As the settlers have only arrived on their homesteads this spring, the crop will not be very large, although considerable land is broken and will be ready for next spring.—*E. W. Hubbell, D.L.S., 1906.*

22. This township is about fifty miles west of Craik (a small but thriving town through which a branch of the C.P.R. runs), and is reached by a well beaten trail

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 5—Continued.

from that place. The soil throughout is sandy loam, suitable for wheat, oats and potatoes, but to insure a good crop considerable rain is necessary. The surface is generally undulating throughout. There is no timber or scrub of any description in this township. There are a few sloughs, but these were dry and there were no other signs of water other than wells dug by settlers in this township. Water is generally obtained at a depth of 30 to 60 feet, but it is not always drinkable owing to a strong alkali taste. From information obtained and my experience, there are no summer frosts; but, on the other hand, hot weather generally prevails during the summer months. We did not perceive any signs of coal or veins of lignite in this township, nor stone quarries, the settlers having to freight fuel either from Chaplin, situated on the main line of the C.P.R., and about forty-five miles distant, or from Craik. A few antelope and coyotes were seen. The original survey of this township was fairly well done. Iron bars minus the tins were found at nearly all the section corners, these of course being practically useless to the settlers, or land seeker. Stamped numbers on the few tins that were found have long since become unrecognizable. As a result, people hunting up their sections had great difficulty in ascertaining their locations. Our nearest postoffice was West Bridgford, in section 32, township 22, range 3; letters are obtained from there and Log Valley in section 34, township 20, range 8. A number of settlers were noticed at the time of survey, building and ploughing, and from subsequent information I learned that all the homesteads were taken. The lack of water and fuel is the great drawback in this section of the country. There is also difficulty in obtaining hay in the near vicinity. As the settlers have only arrived on their homesteads this spring, the crop will not be very large, although considerable land is broken and will be ready for next spring.—*E. W. Hubbell, D L.S., 1906.*

Range 6.

21. This township is about sixty miles west of Craik, and is reached by a well beaten trail from that place. The soil throughout is sandy loam suitable for wheat, oats and potatoes, but to insure a good crop, considerable rain is necessary. The surface is undulating to rolling, except the southern part which is rough and hilly, being on Vermilion hills. A valley about half a mile wide, with alkali bottom, runs across the southern part of this township in a southeasterly direction. There is no timber or scrub of any description on this township and the only noticeable sloughs situated in sections 16, 17 and 18 were dry. These sloughs doubtless furnish the settlers with most of their hay. Water is very scarce, in fact the only supply, except an occasional well, is from two springs situated in the southwest quarter of section 2 and the northwest quarter of section 18. The supply, though not large, is excellent. Wells are dug by the settlers and water is generally obtained at a depth of from 30 to 60 feet, but not always drinkable, it having a strong alkali taste. There is no flooded land in this township. From information obtained and my experience, there are no summer frosts, on the other hand very hot weather generally prevails during the summer months. We did not perceive any signs of coal or veins of lignite in this township, nor stone quarries, the settlers having to freight fuel from the nearest station, which is Chaplin, situated on the main line of the C.P.R. and about 35 miles distant. Stone outcropping and boulders were generally noticeable along the tops of ridges, in the valleys and on the hilltops. The only game is a few antelope in the southern part of the township. Our postoffice was Log Valley, situated in section 34, township 20, range 8, and to which the mail is brought a distance of thirty-five miles from Herbert, on the main line of the C.P.R., once a week. A number of settlers were noticed at time of survey, building and ploughing, and from subsequent information I learned that all the homesteads were taken. The lack of water and

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 8—Continued.

through this township, and at the time of survey (July) there were only three or four settlers' houses. However, I believe most, if not all, of the lands open for homesteads are entered for.—*E. W. Hubbell, D.L.S., 1906.*

Ranges 11 and 12.

9 and 10. *East boundaries.*—These townships are all open prairie; for the most part the surface is rolling, but in some places it is quite level. The soil is chiefly clay or sandy loam, with clay subsoil. Most of the land coming under my observation could be rated only as third class, but it is fairly good for general farming or for grazing purposes. The absence of timber and of any apparent source of easily accessible fuel presents serious obstacles to settlement. No building stone or mineral of economic value was observed.—*Geo. Edwards, D.L.S., 1906.*

Range 11.

11. This township is accessible by a good trail from Swiftcurrent. The soil is chiefly clay, with varying proportions of sand or sandy loam, and is suitable for general farming. The surface is generally rolling prairie with no timber whatever. There are no hay areas of any considerable extent. There is one small creek traversing sections 35 and 25, but not with a permanent flow of water. Russell creek crosses the southern part of the township from west to east. The upper part of the creek appears to be fed by springs which afford a continuous supply of excellent water. The water at time of survey had no current farther than section 9, where it was entirely absorbed, and only stagnant pools along the bed of the stream marked its course. Climate is good, summer frosts are evidently unusual, but the average rainfall appears to be light. There is no fuel supply within the township. There are no stone quarries, and no minerals of economic value. Antelope were seen occasionally. A few ducks were the only other kind of game observed.—*Geo. Edwards, D.L.S., 1906.*

12. This township is reached by a good trail from Swiftcurrent. The soil is almost uniformly clay throughout, about two-thirds of the area being well adapted for general farming; the remainder is too rough for cultivation, but suitable for grazing. The surface is entirely open prairie with no timber whatever. There are no hay areas of any considerable extent. The water supply is scant. One creek traverses the township, but it was partially dried up at time of survey and could not be depended on as a permanent source of supply. Climatic conditions are favourable. No summer frosts were observed. The average rainfall seems to be light. There is no fuel supply within the boundaries of the township. There are no stone quarries, and no minerals of economic value. Antelope were seen frequently. No other kinds of game were observed.—*Geo. Edwards, D.L.S., 1906.*

Range 19.

29. The route for reaching this township is along the surveyed trail from Swiftcurrent towards Battleford, and thence westerly to the township. The trail is in good condition. If approaching from the north along the surveyed trail the best route would be to leave it where it crosses Eagle creek, and follow the old cart trail running southwesterly which enters the township in section 36, and crossing the township leaves it in section 18. The soil is generally six to eight inches of black loam on a clay subsoil. The township is suitable for grazing. Sections 1 to 6 are stony, but the remainder of the township is suitable for farming as far as the soil is concerned. The whole of this township is open prairie. There is no timber. There are a few hay marshes, one of considerable size in sections 16 and 21, and another in sections 25

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 19—Continued.

and 36. The hay from these would be of good quality. The supply of water is limited. Strawberry lake enters the township in sections 4 and 5 and affords a permanent supply of fairly good water, but the remainder of the township would have to depend on the water in the large hay marshes before mentioned. The land is not liable to be flooded. There are no water-powers. The general indications point to a climate with comparatively little rainfall in the summer months. There were no summer frosts. There is no supply of fuel in this township. No coal or lignite veins were found. There were no stone quarries or minerals of any kind found in this township. A good many antelope were seen, also ducks.—*Herbert J. Bowman, D.L.S., 1904.*

30. The route for reaching this township is along the surveyed trail from Swift-current towards Battleford, and thence westerly to this township. The trail is in good condition. The whole of this township is open prairie. There is no timber. The growth of grass is sparse, there are very few hay marshes in the township, but there is a large one in sections 20 and 29 and another in section 7, and smaller ones in sections 10 and 16. The hay from the marshes would be good. Water is scarce in this township, but there is a permanent pond in section 4, also a number of sloughs along the north boundary with fresh water. The land is not liable to be flooded. There are no water-powers. The general indications point to a climate with comparatively little rainfall in the summer months. There were no summer frosts. There is no supply of fuel in this township. No coal or lignite veins were found. There were no stone quarries or minerals of any kind found in this township. A few antelope and ducks were seen.—*Herbert J. Bowman, D.L.S., 1904.*

31. The route for reaching this township would be along the surveyed trail from Swiftcurrent towards Battleford, leaving it about opposite the centre of township 30, range 17, and thence northwesterly across township 30, range 18. The trail is good, but light loads would have to be taken across the hilly country after leaving the trail. The whole of the township is clay. The land would be suitable for grazing, and also for farming, as it is thought that when the soil is tilled it would tend to increase the rainfall. The whole of the township is open prairie. There is no timber. The growth of grass on this heavy clay land is sparse and hay marshes are not numerous, but there are a few in the southerly half of the township, viz., in sections 3, 4, 5, 10, 12, 15 and 16. The hay from the marshes would be good. Water is scarce in this township but may be obtained in sloughs, and marshes along the south and east boundaries except after a succession of dry seasons. The land is not liable to be flooded. There are no water-powers. The general indications point to a climate with comparatively little rainfall in the summer months. There were no summer frosts. There is no supply of fuel in this township. No coal or lignite veins were found. There were no stone quarries or minerals of any kind found in this township. Game is scarce.—*Herbert J. Bowman, D.L.S., 1904.*

Range 27

21. The route by which we arrived at the township was a trail running northerly from Maple Creek. In the summer this is a good trail but in the early part of the season there are some places that are difficult to travel through. This township taken as a whole is a fairly good township, there being a great deal of very good land in it, chiefly clay and clay loam. The surface is all open prairie quite destitute of timber, as are also the townships in this district. There are no hay lands or meadows, as the township is very dry. Water is very scarce, there being no ponds or sloughs nor are there any streams. The lack of water would be a drawback to settlers, but I think water can be got by digging wells. The climate appears to be good. There are no

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 27—Continued.

indications of any summer frosts. Fuel of all kinds is entirely wanting, there being no timber of any kind, and no indications of coal in any part of the township. In fact there are no indications of any minerals or stone to be seen anywhere in the township. Game is entirely wanting, as there are no ponds for ducks or wild geese. Taking the township as a whole, a great part of it is available for agricultural purposes for growing wheat, oats and roots.—*Jas. Warren, D.L.S., 1906.*

22. The route by which we arrived at this township was a trail running northerly from Maple Creek. This is a good trail except in spring, at which time there are places difficult to cross. The southerly portion of this township is very good land. The northerly part is not so good, being in many places very sandy, with sand hills and small scrub. The southerly portion would be well adapted for general farming, wheat and root growing, as the soil is quite loamy and good. The surface is open prairie and in places rolling. There is no timber on any part of the township, only a few small clumps of poplar in the northerly part. There are no hay lands. Water is scarce, there being no sloughs or ponds, but from the appearance of the land water could be got by digging. Fuel is entirely wanting, there being no timber and no signs of coal or lignite. There are no quarries, nor are there any loose stones that could be used for building purposes. There are no indications of any minerals of any kind. Game is scarce, as none was seen by us during the survey. Taking the township as a whole, the southerly portion would be well adapted for general farming, as the situation and general lay of the land is quite favourable for such.—*James Warren, D.L.S., 1906.*

Range 28.

21. This township was reached by a trail running northerly from Maple Creek. This is a fairly good trail, especially in the summer season, though early in the spring parts of the trail were very bad and difficult to travel over. This township had fairly good soil in the greater part, though part of the southerly portion is sandy. With this exception the township has a great deal of good land in it, and would be well adapted for wheat and grain growing. The surface is all open prairie, with the exception of a few scrub bushes in some portions. There are no hay lands in any part of the township. Water is very scarce, and where found contains a great deal of alkali in it, rendering it almost unfit for use. There are no streams in any part of the township, and, of course, no waterfalls or mill sites. The climate is good, and there are no indications of summer frosts. There is no fuel available in any part of the township, except a few poplar bluffs in the southwesterly part. There is no coal or lignite to be found in the township, nor are there any stone quarries, and very few loose stone. There are no indications of minerals of any kind. Game is almost unknown; there are no ducks or antelope. Taking the township as a whole, it is better adapted for agricultural purposes than for ranching.—*Jas. Warren, D.L.S., 1906.*

22. The route by which we arrived at this township was by a trail running northerly from Maple Creek, which, except in a few places, we found very good, the very wet season having made some parts heavy for travelling. The northerly portion of the township is badly broken up by ravines running toward Saskatchewan river. The southern portion is open and undulating prairie, there being no timber of any kind in the township. There are no hay lands and no marshes or sloughs. Water is scarce, there being no streams of any kind. The nearest permanent supply is at the river to the north. There is no fuel in the township, but a little timber can be got in the valley of the river. There are no indications of coal or lignite, nor any stone quarries or minerals of any kind. Game is also scarce, only a few ducks along the river. The southern part of the township would be fairly well adapted for agriculture, but the northerly portion is not available for such but could be used only for grazing along with the adjoining lands.—*James Warren, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 29.

2. I left Medicine Hat on June 21, passing through Cypress hills via the Lodge police post and thence down Lodge creek to the work. The trails at this time of the year were in rather poor condition owing to the heavy rainfall during the end of May and early part of June. There is also a trail from Maple Creek to this township, and the distance is somewhat less than from Medicine Hat, but is reported to be much rougher. Many settlers coming to this locality come via Havre, a station on the Great Northern railway and distant some forty miles from this township, and the trail is said to be fairly good. The soil on the uplands is clay, clay and sand, and clay mixed with stones, and does not appear to be adapted to farming on account of the small rainfall. The soil in the valleys is sandy or clay loam and when irrigated yields most luxuriant crops. I am informed of, and indeed some of the small garden patches that came under my observation showed, the beneficial effects of irrigation producing all kinds of garden vegetables, and a few small fields of oats and hay. The uplands, however, appear to be well adapted for stock grazing purposes, as the herds seen in this locality all bore testimony to the excellent quality of the feed. The surface of the township is gently rolling prairie broken by the valleys of Lodge and Middle creeks. There is no timber in this township, but along the creeks one finds an occasional clump of willow brush. There is no land that could be properly called hay lands, except a very small amount in the valleys, and even here the crop is exceedingly short, although cut by ranchers in place of better. The township is well watered by Middle and Lodge creeks, that flow through it in a southerly direction. These creeks, as is characteristic of prairie streams, rise and fall with great rapidity. When I first reached Middle creek the water was from two and one-half to six feet deep, with a current of four miles per hour, a week later it had fallen to from one to three feet with a current of two and one-half to three miles per hour, and I was credibly informed that both this creek and Lodge Creek ceased to run in August and September. There was always water enough, however, for watering stock. The valley is liable to be flooded to a depth of from one to three feet almost any spring or early summer. Owing to the extreme fluctuations in the volume of water, I do not think these streams would be suitable for developing power of any kind, but the settlers along them are all engaged in putting in irrigation systems on a small scale, and I have no doubt will very greatly increase the value of these bottom lands. After June, there is very little rainfall, usually bright weather but subject to violent winds, indeed there are but few days that are not windy and during July and the end of June much haze and smoke seemed to be in the air, which rendered daylight observing somewhat difficult. For fuel both wood and coal are in use. The wood may be obtained in Cypress hills, consisting of spruce and poplar, but is very rapidly disappearing. Coal is the chief fuel and is at present obtained about ten miles south of this township in the state of Montana, where settlers go and dig it for themselves. It is of the bituminous variety, is largely mixed with shale and other detrital matter and contains considerable sulphur. No veins of coal were seen in this township. No stone quarries were observed. No minerals of economic value were found. Jack-rabbits, chickens, a few ducks, antelope, kit foxes, coyotes, were comparatively numerous, and badgers abound everywhere, but antelope are being rapidly driven back by the advancing settlements. There are three settlers in this township who are all located on Middle creek. All have small herds of cattle from two hundred and fifty to three hundred and fifty each, and each of them is working on an irrigation scheme by means of which he hopes to be able to raise at least all the hay required to winter his herd, and which if successful will tend to increase the value of their holdings very materially. There were other locations along those creeks open at the time of my visit which I have no doubt might be as successfully irrigated as those mentioned and would make this township of some considerable value.—*A. H. Hawkins, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 7.

59. The township is somewhat difficult of access owing to the valley which runs from the northwest corner to the southeast corner and is on an average of 300 feet deep. There is a trail from Keheewin Indian reserve to Moose lake, which crosses the northeast corner of this township and a surveyor's trail which is very rough crossing the township from the southwest corner to the first named trail. The township is fairly heavily timbered with poplar, birch and spruce up to 14 inches diameter, but there is not sufficient timber nor is it of large enough size to warrant a timber reserve. An excellent stream runs from Keheewin lake in the southeast corner to Bangs lake in the northwest corner and there are also a few smaller tributary creeks. The feed along the eastern slope of the valley is excellent and slough hay can be cut in the valley bottom, otherwise there is little feed of any sort. The soil is good, averaging 6 inches black loam and clay subsoil. Moose, caribou and deer are to be found, also fur-bearing animals as bear, mink, coyotes, etc. There are fish in Keheewin lake and Longlake creek but no whitefish. No minerals were observed.—*M. W. Hopkins, D.L.S., 1906.*

60. Two excellent trails cross this township, one from Keheewin Indian reserve and the other from Fort Pitt and Onion lake, both joining in section 16 and leading to Cold lake. The township is well supplied with water, by lakes and creeks. Hay is fairly plentiful. The soil is an average of six inches black loam with a clay subsoil. Around Moose lake the soil is sandy. There is ample timber in the township for building and fuel purposes, including poplar, spruce and jackpine. A large part of the township especially in the centre has been burnt, leaving large patches of brûlé standing and fallen. The country is well hunted by Moose Lake Indian reserve Indians and game is not plentiful. Moose lake is well stocked with whitefish and there are fish in Bangs lake.—*M. W. Hopkins, D.L.S., 1906.*

Range 8.

59. Two trails cross this township, the one a well beaten trail from St. Paul to Moose lake and Cold lake, the other an old trail (not well travelled) from Fort Pitt to Lac LaBiche. There are many lakes all containing good water. Also two good creeks, one running through sections 26, 27, 34 and 35, the other through sections 6, 5 and 4; the former is fed by springs and probably never dries up, the latter at time of survey had only a few pools of water. The soil is good, averaging six inches black loam and clay subsoil. The township is somewhat stony in parts, especially on Chickenhill in sections 33 and 34. Timber for fuel is fairly plentiful, especially in the eastern half of the township. Good upland and slough hay can be cut. Moose, caribou, bear and other fur-bearing animals are found. Fish are found in Chickenhill lake, but not whitefish.—*M. W. Hopkins, D.L.S., 1906.*

60. The whole township is well adapted to farming; as the land is level and undulating with the exception of sections 1, 2, 11, 12, 14 and 13, which are broken by small ravines in places, but are still first-class farming lands. There is fair timber in the south of the township, spruce, poplar and some ridges of jackpine, but the northern part of the township is only lightly timbered with poplar and willow brush. An excellent creek, Yelling creek, runs from west to east clear across the township and joins the larger Longlake creek in section 12. Yelling creek has its source in a spring in township-60, range 10, and is said never to run dry. There are not many sloughs and only one lake in section 25. The soil varies from two inches to six or nine inches of black loam throughout the township; all the subsoil is clay. Moose lake trail, which is a well travelled trail, crosses the southeast corner of the township and wagons can traverse most of the township with little difficulty. There seemed to be rather a scarcity of game, but the trails and tracks show that at times game com-

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 8—Continued.

prising bear, moose, caribou and deer are fairly plentiful. No fish were observed. No traces of gold, &c., were observed, nor coal nor lignite.—*M. W. Hopkins, D.L.S., 1906.*

Range 9.

59. The whole township is of excellent farming character and is well supplied with timber, water and hay. The soil is of a rich black loam from two to twelve inches in depth with clay subsoil. The township is well supplied with water by lakes, sloughs and creeks. Vincent lake is surrounded by timber suitable for fuel or building purposes, with the exception of the east side. Upland and slough hay can be cut in ample quantities. An excellent trail traverses the townships from the southeast to northwest corner. Duck and chicken are plentiful and Vincent lake is full of fish such as whitefish. No signs of coal, lignite or minerals of any kind were observed. The township is fairly well settled already.—*M. W. Hopkins, D.L.S., 1906.*

Range 10.

59. A good trail from St. Paul de Metis crosses this township and there are several other trails branching from this main trail. The soil is good, averaging six inches black loam with clay subsoil. Water is plentifully supplied by lakes, sloughs and creeks. Hay, both upland and slough hay, can be cut in abundance. There is not very much building or fuel timber in the township, but plenty can be cut in a radius of six miles. The northern part of the township is well wooded. Duck and chicken are plentiful and there are plenty of jackfish and perch in Vincent lake. No traces of minerals were observed. Generally the township is most suitable for mixed farming.—*M. W. Hopkins, D.L.S., 1906.*

60. The old Lac LaBiche and Ft. Pitt trail crosses the northeast corner of the township and a rough trail has been cut from section 2 to section 23 and thence across to the Lac LaBiche trail in section 25. There is also a hunters' pack trail across the township to Muskeg lake. The township is very thickly wooded with poplar, spruce and some tamarack and birch; the undergrowth also is very dense. There are several lakes, all containing good water. The northeast corner of the township contains some good hay sloughs and there are some in sections 1 and 12, otherwise feed is scarce. The average soil is 6 inches black loam with clay subsoil. No traces of lignite, coal or minerals were observed. Moose and caribou are to be found, also bear, mink, fox, &c., in fair quantities. Fish are fairly plentiful in Island lake (now called Mann lake)—*M. W. Hopkins, D.L.S., 1906.*

Range 12.

3. The route to this township is the same as that to township 3, range 13, by trail south to Kip coulée; thence along the north side of the coulée to the east end of King lake; thence southerly over the bare rolling prairie. The soil is a sandy brown loam about eighteen inches in depth generally. It would make fair farming land but for the drouth. The surface is quite rolling and in fact there are some ravines in the southeastern part of the township and a high ridge or two. It is all prairie without the least scrub or timber on it. There are one or two lake-bottoms in it. Hay is not plentiful at all but a little can be obtained almost anywhere in the township. It is of good quality, there being no rank growth in any of these townships. Water was found only in a small ravine and there was very little in it. It seemed to be a spring but was nearly dried up. The water was not tasted as we got our water in barrels from Milk river, a haul of nine miles, but the water was good and fresh. The land is not liable to be flooded. The climate was usually fine and warm and dry but at times very strong, cool winds were experienced. No summer frosts were noticed. There was no

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 12—Continued.

fuel in the township but coal can be had at Taber. There were no stone quarries or minerals. The only game was antelope. All of this country makes fairly good grazing land, but the scarcity of water is a drawback.—*W. G. McFarlane, D.L.S., 1906.*

Range 13.

1. The best route for reaching this township is by way of Coutts, a station on the International boundary, on the Alberta Railway and Coal Company's railway, and from thence a good trail leads directly through the township. The soil varies from clay to sand and gravel, but is chiefly three to eight inches of loam with a clay sub-soil. It produces a fair crop of grass and with irrigation would doubtless yield abundantly but under the present conditions it is adapted only for cattle-raising. Several settlers whom I met and whose crops I saw were not enthusiastic about the farming possibilities. The surface is rolling prairie cut by several deep coulées running from Sweetgrass hills to Milk river. In some of these we found poplar and willow bush and a few large cottonwood trees. The quantity of timber is not sufficient to make it of any economic value, except to the settler. There are no hay lands in this township. The principal supply of water is from Milk river flowing across the northeasterly corner of the township. The supply is apparently sufficient for the present demands but I was credibly informed that in very dry seasons it ceases to run entirely. The valley is liable to be flooded during the spring freshets. The river would average about three chains in width and from three inches to three feet in depth and the current from two to three and one-half miles per hour depending upon the season. Several good springs were found along the coulées and are used by the cattle as watering places. There are no available water-powers in this township. The climate is dry and warm during the summer months, but is subject to summer frosts. The nights are always cool, and frequent violent winds sweep over the entire country. The principal fuel is coal, and indications were observed on the north boundaries of sections 24 and 23 where these lines cut the coulées. Shale and what appeared to be weathered coal was observed in several places along the coulées. There is a most bountiful supply of stone in this township and easily accessible at any place along Milk river, or on Police or Rocky coulées. The supply is practically unlimited and is used by settlers for foundations, &c., and appears to be a very good building material. No minerals of economic value were observed although a prospector showed me what he called petroleum, but declined to point out the position of his location. Chicken, a few ducks and rabbits, coyotes and kit-foxes were all the varieties of game seen in this township. There are some seven settlers but all devote themselves to cattle or horses and no farming of any account is attempted.—*A. H. Hawkins, D.L.S., 1906.*

3. The route followed to this township was by trail south from Furman's ranch to Kip coulée; thence along the north side of the coulée by trail to the east end of King's lake; thence southeasterly by south over the prairie. The trail was hard and dry, but we could not cross the coulée west of King's lake as the water from the irrigation canals make the bottom soft and miry. The soil is a brown sandy loam about eighteen inches in depth in general, but there are a few lake-bottoms which are very heavy clay. It would make fair farming land. The surface is rolling prairie with several fairly large dry lake-bottoms and a few ridges. There is no scrub or timber in it. The lake-bottoms are near the eastern side. Hay is scarce, but a little of good quality can be found in any part of the township. There was no water in the township, but the lake-bottoms showed signs of alkali. The climate was usually mild, dry and clear, but sometimes cloudy and very cool with very high winds almost hurricanes. No summer frosts were noticed. Fuel is not to be found in the township, but coal can be had at Taber. There are no stone quarries or minerals in the township. The

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 13—Continued.

only game was antelope, but ducks and geese were plentiful in Kip coulée. This township is more rolling than those to the north, and some of the ridges are somewhat gravelly and stony. There are also quite a number of fairly large lake-bottoms which show a very heavy clay soil.—*W. G. McFarlane, D.L.S., 1906.*

6. To reach this township one can drive anywhere over the prairie with the exception of the northeast corner where Chin coulée just crosses the corner, but side coulées cut it up somewhat. There are no trails in the township. The soil is usually a brown loam eighteen inches deep, but it is so dry that it would not produce good crops unless it were irrigated. It is a little stony and gravelly near Chin coulée. It is fairly good for grazing. The surface is gently rolling prairie without a sign of scrub or timber, but the northeast corner of the township is rough as it is cut up by side coulées running out from Chin coulée. Hay is very scarce, but a little of good quality can be had here and there over the whole township. There is no water whatever in this township, but there is not much sign of alkali except in Chin coulée, where it can be noticed. The climate was fine, warm and dry, but subject to high winds. No summer frosts were noticed. There is no fuel in the township, but coal can be had at Taber. There are no stone quarries or minerals. The only game seen was antelope. In each of these townships there are small depressions or hollows which hold water for a short time after a heavy rain, but water is scarce here.—*W. G. McFarlane, D.L.S., 1906.*

7. There are no trails of any importance in this township, but one can drive anywhere over it except down the banks of Chin coulée, which are high and steep. The surface is almost level prairie except along Chin coulée, where numerous side coulées cut the country up. The soil is a good loam, but is very dry. In the coulée it is heavier, but the whole township would need to be irrigated before it would be good farming land. There is neither scrub nor timber anywhere in the township. Hay is very scarce all over the township, especially down the coulée, but a little of good quality can be cut on the high land. There is no water in the township. The climate was bright and warm and dry, but subject to strong winds. No summer frosts were noticed. There is no fuel in the township, but coal may be had at Taber. There are no stone quarries or minerals in the township. The only kind of game seen was antelope. This township is badly cut up by coulées as Chin coulée runs across it and there are numerous side coulées, but the soil is rather better than in the township to the west of it.—*W. G. McFarlane, D.L.S., 1906.*

65. The township is gently rolling and much cut up by marshy lakes. Hay is abundant. The township is timbered with poplar and scattered spruce. The soil is clay loam.—*A. W. Ponton, D.L.S., 1906.*

66. Beaver lake covers a large area. Much land suitable for settlement was observed adjacent to the lake shore. The township is timbered with poplar of good size, and scattered spruce. The surface is rolling. Whitefish is abundant. An Indian settlement is located chiefly in range 13, but no reserve has yet been allotted to these Indians.—*A. W. Ponton, D.L.S., 1906.*

67. Lac LaBiche covers a large area. The country is high, rolling and well drained. It is heavily wooded with poplar, and the soil is clay loam. Fishing offers opportunities to settlers, as whitefish are plentiful in the lake.—*A. W. Ponton, D.L.S., 1906.*

68. Lac LaBiche and Square lakes cover a large area. Good land occurs between these lakes, and also adjacent to Square lake. Square lake is a fine body of water, and whitefish are obtainable in it. There is also much good land suitable for settle-

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Range 13—Continued.

ment between Grand bay of Lac LaBiche, in township 67, range 13, and the northern end of the lake, in township 68, and is accessible by trail from the Hudson's Bay post. The country is generally wooded with poplar, but fairly open ground can be found adjacent to the lake.—*A. W. Ponton, D.L.S., 1906.*

Range 14.

6. The route followed to this township was due south from Furman's ranch. This trail runs down to Kip coulée to other ranches. There is another trail running towards Furman's ranch from hay-meadows in the southwest part of the township but one can drive anywhere over the township. The soil is a brown loam about eighteen inches in depth and would make good farming land if irrigated. It is now fair grazing land. The surface is level or gently rolling prairie without a sign of scrub or timber on it. Hay is rather more plentiful in the southwestern part of this township than in the others. It is of good quality too, but is not abundant. The chief reason for the great scarcity this year seems to be the drouth. Consequently there is only short grass for the cattle and horses, so they roam farther and pick the grass off short. There was no water to be found in the township and we had no rain. The climate was fine, warm and dry, but strong winds were frequent. There is no fuel in the township, but coal can be had at Taber. There are no minerals or stone quarries. The only game seen was antelope and jack-rabbits. This township would make excellent farming land if irrigated but the scarcity of water is against it at present.—*W. G. McFarlane, D.L.S., 1906.*

7. This part of the country is all open prairie, but Chin coulée runs right across this township. The coulée is over two hundred feet in depth and in places its banks are steep, otherwise one could drive all over it. There is a trail, however, from Gardner's ranch, in township 8, range 14, to Furman's ranch in this township in the coulée in section 14. The soil is usually a sandy loam for a depth of nearly eighteen inches, but along the bottom of the coulée there is a heavy clay with boulders, while to the north of it there is mostly sand near the coulée. It is very dry, otherwise it would be very good agricultural land. If it is irrigated it should produce good crops. The surface is all prairie, usually gently rolling, except along the Chin coulée, where numerous side coulées cut it up a great deal, especially to the south. There is no timber, but two trees, willow, are growing in the coulée opposite Furman's ranch. The water is slightly alkaline, but is found only at Furman's ranch in his well, which has not gone dry but gets low at times, when too much stock is watered out of it. Part of the bottom of the coulée may be flooded at times, as some of it was once the bottom of a shallow lake. Hay is scarce but of good quality in the south part. Needless to say there are no water-powers. The weather was fine, dry and warm, but there was usually a breeze and sometimes it was very windy. No summer frosts were noticed. No fuel is to be found in the township, but coal can be had at Taber, which is within easy reach. There are no stone quarries or minerals in the township. The only game seen was antelope. This township is probably more cut up by coulées than any of those around it, and the soil is lighter close along the north side of Chin coulée, but the south side has some good land.—*W. G. McFarlane, D.L.S., 1906.*

8. The best route to reach this township is by the trail from Taber direct to Gardner's ranch although one can drive anywhere over this country as it is all open, level or gently rolling prairie. The soil is usually about eighteen inches of sandy loam. There are a few stones toward the west side of the township. It would make good farming land if irrigated. The surface is gently rolling bare prairie without a sign of scrub or timber on it. Hay is scarce but of good quality. There are a few

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 14—Continued.

hay meadows scattered over the township but they are mere hollows. The water is fairly good with but little alkali in it. It was only found at Gardner's ranch where there is an excellent spring which never fails, and also a small pond. There are no water-powers. The climate was fine, warm and dry, but subject to strong winds. No summer frosts were noticed. There is no fuel in the township, but coal can be had at Taber. There are no stone quarries or minerals. The only game seen was antelope. This township is rather more rolling than those just west of it, otherwise it resembles them closely.—*W. G. McFarlane, D.L.S., 1906.*

35. The soil (of what land there is) is first-class undulating prairie, black loam up to fourteen inches deep; but about two-thirds of the township is covered by the waters of Sullivan lake, which is of a light clay colour, alkaline and of little use. We were fortunate in finding a shallow slough of fresh water on section 29, on the peninsula, and another on section 24, on the east side of the lake, but none on the islands. There is a small bluff of poplar and willow along the lake shore on the fraction of the northwest quarter of section 27, west of the straits. This, with a few clumps of willow on the islands, is all the timber in the township. There is a coal seam along the lake shore on sections 29 and 30. I could not tell how thick it was on account of the water being only about eighteen inches below the top of the seam. Granite and sandstone boulders all along the shore of the lake, some of them very large, were all the stone we noticed. No other minerals of economic value were found. There is a great quantity of upland hay, but no regular meadows. There are no water-powers. No frosts occurred while I was there (July). We found quite a quantity of gooseberries and some raspberries on the islands. There are some poplar bluffs that would serve for fuel in the next township east of this one, but none fit for building purposes. Waterfowl and prairie chicken are plentiful, but we noticed no large game. This township can be reached from Stettler by a fair road around the north end of the north arm of Sullivan lake. If good water could be got by sinking wells, what land there is in this township, would make first-class grain farms, I believe.—*A. McFee, D.L.S., 1906.*

68. The country is rolling with clay loam soil. Owl river flows south through the eastern portion to join Lac LaBiche. Extensive hay lands occur at the mouth of this river.—*A. W. Ponton, D.L.S., 1906.*

Range 15.

6. The route followed to this township was northerly across the prairie to King lake; thence westerly up Kip coulée to this township along a trail. It is a good dry road, but one could not cross the coulée with a load where there is water. The soil is a brown loam about eighteen inches in depth and would make good farm land if irrigated. It is only a grazing country now. The surface is usually a gently rolling prairie, but the south side is considerably broken up by Kip coulée. It has no scrub or timber on it whatever. Hay is scarce, but a little of good quality could be had almost anywhere except close to the coulée, where the grass was eaten off short. The only water was that running down the coulée. It is a fine stream of fresh water, about twenty-five feet wide and from two to five feet deep, with a current of one or two miles an hour. There is no water-power. The climate was cool except in the middle of the day, but usually bright. High winds were very frequent. Light frosts were noticed. Rain was scarce. No fuel was found, but coal can be had at Taber. The only game found was antelope and ducks. The water from the irrigation ditches is a great help here, especially for grazing.—*W. G. McFarlane, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 15—Continued.

7. As the country is all open prairie one can travel anywhere over it with wagons, except at Chin coulée where the banks are steep and high, and quite a number of side coulées are found. Some of these side coulées run down to a narrow stony gorge, while others are broader and flat at the bottom, giving a good road in and out of the coulée. The road used by us was in section 30, just north of Mr. Robertson's sheep ranch. The soil is generally a sandy loam. Here and there, however, some gravel is found, and in some places the surface is quite stony. The greater part of the township, especially back a short distance from the coulée, is, however, very good farming land, but is very dry. Near the coulée quite a number of small ravines or side coulées run into the banks, some for quite a distance, cutting the sections up rather badly: The surface is all prairie. There is no timber or wood near, but some very small scrub is found in the side coulées, though too small to be of any use. Hay is scarce, but some can be found on the high land in slight hollows. It is good, as it grows on dry land, there being no sloughs in the township, except one at Robertson's ranch in section 19, which is really more of an artificial reservoir. The water is fairly good but slightly alkaline. It was only found at the ranch. Considerable alkali is seen down the coulée but not very much on the high land. There is no danger of flood in this township as there are no streams, although water may soon be running down the coulée towards the east from the irrigation canals and ditches. There are no water-powers. The climate was very hot during part of August, until we had a three days' steady rain, when it became fairly cool. No summer frosts were noticed. High winds are often a considerable inconvenience in running lines. No fuel was found in the township, but plenty of coal may be had at the mines at Taber. There were no stone quarries or minerals found in the township. Antelope was the only game seen. In general all this country is one monotonous sameness, gently rolling bare prairie with from twelve to eighteen inches of brown sandy clay loam, not a slough to be found, no hills except along Chin coulée and the side coulées running into it. This is the only break in the surface, but it is a decided one, as its banks are invariably over two hundred feet high, steep and also often stony. Very few stones are found when one gets a short distance away from the coulées.—*W. G. McFarlane, D.L.S., 1906.*

8. As the whole township is bare, almost level prairie, one can travel anywhere over it with wagons. There are only two well-beaten trails crossing it from southeast to northwest towards Taber. The soil is a brown sandy clay loam from twelve to eighteen inches in depth, with a heavy clay subsoil. It is very dry, not even a sign of moisture at the bottom of the pits. Were it not so extremely dry it would be first-class farming land, but unless irrigated it will not likely produce a good crop year after year. The surface is all gently rolling or almost level, bare open prairie, without a sign of scrub of any kind and very few stones. Hay is scarce, but some can be found in hollows. It is of good quality, as there is no water, and it is all upland hay. Water was not to be found anywhere in the township either in sloughs or springs. Slight traces of alkali were seen. There are no water-powers. The climate was quite hot for part of August, but turned cooler after we had a three days' rain. No summer frosts were noticed. High winds were frequent. There is no fuel in the township, but coal can be had at Taber. There are no stone quarries or minerals of any kind. Antelope was the only game found. When this township is irrigated it will probably make excellent farming land.—*W. G. McFarlane, D.L.S., 1906.*

35. The soil is from four to five inches of clay loam with very hard clay subsoil. The surface of the northwest part of the township is rather rough and hilly, with pot-holes. Most of the remainder is rolling, the eastern part near Sullivan lake being gently undulating. The lake takes up quite a portion of the northeast part of the township.

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 15—Continued.

There is a long narrow lake of clay-coloured and alkaline water that extends north and south in sections 20, 29 and 32. There is (in high water) a fair sized creek of good fresh water that runs through sections 32, 28, 21, 22, and empties into Sullivan lake, in the southwest quarter of section 23; but which goes dry except for deep holes some of them ten feet deep. There is no timber and no minerals of any value. The only stone noticed was sandstone and granite boulders. There are no hay meadows of any size, but upland hay can be cut almost anywhere in the township. There are no water-powers. Waterfowl is plentiful, also prairie chicken. We saw a few antelope. No frosts were noticed. Fuel can be had about seven miles north, there being coal on the northwest arm of Sullivan lake. There is a fair wagon road to this locality from Stettler. The banks of Sullivan lake are low and the water is alkaline, clay-coloured and no good. Mr. Leithead has a small house, stables (or sheds) and a pasture fenced on the northwest quarter of section 19. There is a good spring on it. The township as a rule is suitable for mixed farming or stock-raising. Mr. Leithead had a large herd of cattle in this vicinity. The climate seems good.—*A. McFee, D.L.S., 1906.*

68. Lac LaBiche lies immediately south of the line. On the north side the country is generally spruce swamp. Lac LaBiche river leaves the lake in this range. The country is unfit for settlement.—*A. W. Ponton, D.L.S., 1906.*

Range 16.

6. The route followed was by the trail up Kip coulée. There was also a trail along the north side of the coulée running toward Lethbridge. The soil is a brown loam about eighteen inches deep, but there is some heavy clay in places and considerable stone along the sides of the coulée. It will make good farm land when irrigated but is fair grazing country now. The surface is gently rolling prairie along the north of the township, but is somewhat rough near Kip coulée, especially to the south side where rocks show out along the bank and in places the bank is quite steep. The coulée runs right across the township. There is no timber or scrub of any kind. Hay is scarce, but a little could be cut on the high land. The only water was the stream in Kip coulée, which was fresh and good. The stream would be about twenty-five feet wide, from two to five feet deep and current about two miles an hour. There is no water-power. The climate was cool with slight showers and rather cloudy. Strong winds were of very frequent occurrence. Frosts in the morning were sometimes noticed. Some small coal seams were found along the south bank of the coulée. The coal was a soft bituminous of fair quality. Coal could also be had at Taber. There were no stone quarries, but some large soft sandstones were seen in layers, but it was of poor quality. No minerals other than coal were found. The only game was antelope, ducks and jack-rabbits. The fresh water in the coulée makes this township of considerable value for grazing purposes.—*W. G. McFarlane, D.L.S., 1906.*

7. The route followed was due south by trail from Taber to Garrick's ranch in Chin coulée. The soil is good, except in places down the coulée, but is rather lighter than to the north and indeed too dry, but will make good farming land when irrigated. There is nothing but bare prairie without a sign of scrub, except in the coulée, where there are a few sticks one inch in diameter. Hay is very scarce, but there is a little in the hollows and it is good. There is no water except in Chin coulée, at Garrick's ranch in wells, a slough at Robertson's ranch in section 25, and a small spring up in a side coulée in section 34. The water is somewhat alkali. There is no water-power. No summer frosts were noticed. Coal can be had in abundance at Taber mines. No stone quarries were found. No minerals were found. The only game was antelope. The sides of Chin coulée are usually very steep and high and considerable

TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 16—Continued.

rock crops out on the ridges. There had been large shallow lakes in the coulée, but they are now dried up.—*W. G. McFarlane, D.L.S., 1906.*

8. This township lies due south of Taber about five miles. There is a very good trail into it. The soil is a brown sandy loam about one foot in depth over the whole township with a heavy brown clay subsoil. It would be excellent farming land if well watered. The surface is level or very gently rolling without a sign of any scrub whatever. There is no timber within miles of it. Hay is very scarce. There are no hay sloughs and the upland hay was very short. Water is not to be found anywhere at the surface in the township, but there is a good well just to the north of it. There are some hollows that would hold water for some time but they were all dry and hard. Needless to say there is no water-power. The climate was very hot in August, but is subject to cool spells with sudden showers. Rain was not plentiful, but we had one storm which lasted steadily for three days. There is no fuel at the surface but there may be coal below it. Very little stone is to be seen. There are no minerals. A few antelope were the only game seen there. This township will make good farming land if irrigated but will not be sure of a crop on account of the drouth.—*W. G. McFarlane, D.L.S., 1906.*

35. There is a good wagon road from Stettler to this section of the country. The soil of this township is generally good, but is very hilly with numerous sloughs and pot-holes fringed with willow and small poplar. There is no timber worth speaking of. Hay can be had around most any of those sloughs or pot-holes. There is a spring on the southwest quarter of section 4 and a small lake. There are also two lakes on section 3 and one on sections 9 and 10. The water is all fresh. There are no water-powers. No frost was noticed. The climate is good. Fuel can be found without much trouble, coal at the northwest arm of Sullivan lake, about ten miles northeast, and wood about the same distance north. The only stone I noticed was granite and sandstone boulders on the ridges and around the lakes. I saw no minerals. Game, such as geese, ducks, cranes and prairie chicken is plentiful. I saw six antelope. Although the township as a rule is rather rough I consider it one of the best in this part of the country for stock-raising and mixed farming. There are no creeks or streams, but any number of deep ponds, nearly all of these fringed with tall willow which makes good shelter for stock. There is also grass in abundance, even on top of the hills. There are no squatters in the township.—*A. McFee, D.L.S., 1906.*

68. The country is rolling and timbered with good sized poplar. The soil is clay loam. Much land is fit for settlement.—*A. W. Ponton, D.L.S., 1906.*

Range 17.

6 and 7. The best route for reaching these townships is from Stirling, a station on the Alberta railway and St. Mary River railway, from which point trails lead to all parts of these townships. At the time of my visit the trail was in good condition and is said to be generally so. The soil generally is clay loam with a clay subsoil, very hard in places, and from the luxurious crop of grass found all over would appear to be fairly good agricultural land, although the small deposition of moisture in this locality might probably be a drawback to farming. The grazing, however, is excellent over both townships. The surface is generally rolling prairie except where cut by the Etzikom and Chin coulées, which range from one hundred and fifty to two hundred feet in depth through these townships. There is neither timber nor scrub in either township. The only water found was in Etzikom coulée, which is said to be the overflow from irrigation ditches, and will doubtless be utilized as the systems are extended. At present the stream is from eighteen inches to five feet deep and

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 17—Continued.

twenty to sixty links wide, with a current of from one to two miles per hour. The water is fresh, but carries large quantities of detrital matter. The valley is not liable to be flooded to any extent. There are no water-powers. A few springs along Chin coulée provide water for cattle grazing in that vicinity. There are no indications of summer frosts. The climate is said to be very equable but subject at all times to violent winds. I saw no fuel in these townships, but was informed that there were veins of lignite on Etzikom coulée in township 6, range 16. At present fuel must be procured from the nearest railway station. No stone quarries were seen. No minerals of economic value were found in these townships. Ducks, geese, a few chickens, foxes and coyotes were the only varieties of game seen.—*A. H. Hawkins, D.L.S., 1906.*

64. What good land occurs in this township is very much cut up by muskegs and swamps; the surface is rolling and covered with poplar, birch, and in places spruce and tamarack. In sections 32 and 31 there is valuable spruce timber from eight to twenty-four inches in diameter surrounding a long narrow lake and extending some distance north and south of the line. There are no hay meadows or tracts of even partially open land in this township.—*R. W. Cautley, D.L.S., 1906.*

Ranges 17 to 20.

68. The country is almost entirely spruce and tamarack swamp. The timber is small and recent fires have destroyed large areas of it. The country generally has no present value. To the north, however, Lac LaBiche river flows west to Athabaska river, and along its banks good land extends back for a quarter of a mile. The river is only navigable for small boats during exceptionally high water; at other seasons shallow rapids are frequent. A trail from Lac LaBiche makes this land accessible. Athabaska river crosses through the west portion of range 20.—*A. W. Ponton, D.L.S., 1906.*

Range 18.

28. This township may be reached by either of two good trails from Calgary or Stettler. The soil other than in the ravines, canyons and river flats, is first class from twelve to eighteen inches of clay loam on chocolate-coloured clay, with clay sub-soil, while in the ravines, canyons and river flats it is clay, growing very little or no vegetation. The surface is generally rolling with deep ravines and canyons running from every direction towards Willow creek, which creek (from marks along its banks) had from four to six feet of water in it at times. However, I would judge it to be dry the most of the year. There is only a little alkaline water in holes at present that looks like lye. Red Deer river runs through a canyon about four hundred feet deep with a valley about half a mile in width running into the township at the northwest corner of section 6 and running out a few chains east of the centre of the south boundary of 6, cutting the section up badly. Sections 4, 5, 8 and 9 are very hilly with some pot-holes, with good soil. Fuel may be got along the river banks and in some of the ravines. Although I did not come across any coal seams I noticed frequently that coal had been washed down the river and gulches. There seems to be any quantity of stone along the cutbanks in the canyons and river, mostly sandstone and some granite. I saw no other minerals. Game birds such as geese, ducks, crane, prairie chicken, plover, &c., are plentiful, and a few deer are to be found in the gulches. There is no timber in this township except along the river and some of the ravines, where some black poplar up to sixteen inches in diameter and some brush can be found. I noticed no frost. I consider it a high, dry country and suitable for grain raising or mixed farming. There are a good many stockmen (or ranchers) in

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 18—Continued.

this section of the country, the grass being good, and they have wire fences running in all directions through the prairie. Willow creek canyon runs southwesterly across the township from section 24 and joins the Red Deer canyon in section 7. It is impossible to cross this creek (in this township) with wagons, but it can be got round in range 19 or across in range 17. There are no water-powers.—*A. McFee, D.L.S., 1906.*

64.—*North outline.*—Sections 36 and 35 in this township contain patches of heavy spruce timber surrounding some lakes which occur in them, but together with section 34, are unfit for settlement owing to the rough broken nature of the surface. In these sections there is also a good deal of heavy jackpine. A narrow lake, from five to six miles in length and varying from one mile to half a mile in width, occurs in section 34, which lies almost due north and south, and is surrounded by low broken hills from 40 to 120 feet high. Sections 33, 32 and 31 contain some second class agricultural land having a rolling surface and covered by second growth poplar and heavy *brulé*. A small creek, flowing north, crosses the line in section 33 and flows through an old beaver meadow in section 4 of about forty acres; this meadow bears a luxuriant growth of wild hay and may extend much farther than it appeared to do from the line.—*R. W. Cautley, D.L.S., 1907.*

Range 19.

64. *North outline.*—Section 36 is covered with dense poplar, birch and spruce woods from four to eight inches in diameter, the remaining sections being covered with heavy spruce *brulé* and scrub, except where patches of muskeg filled with green spruce and tamarack occur. The surface is rolling and in sections 33 and 34 is higher than any of the country for miles around, being about 140 feet higher than the ground level. There is a good creek in section 35 flowing north, and a large lake, which I have been told is called Skeleton lake, and which appears to be five or six miles long in a southwesterly and northeasterly direction, and one or two miles wide, lies one or two miles to the north of sections 33, 32 and 31. Rated as agricultural land this township falls in the second class.—*R. W. Coutley, D.L.S., 1907.*

Range 20.

51. This township was at one time part of a timber reserve, but fires have destroyed the timber and it is now covered with thick scrub, and in places, scrub with a heavy windfall. The east part of the township is rolling; the west is level. There are a number of hay sloughs and a number of large lakes. I found a number of squatters in the township, some of them having been there for fifteen years. Cattle-ranching is their principal occupation. They say that the reason for not farming is, that they are afraid that the government might force them to leave.—*G. J. Lonergan, D.L.S., 1906.*

59. We followed the Victoria trail to the intersection of an Indian pack-trail near the north boundary of section 31, township 58, range 19. Then we followed this pack-trail to section 20 township 59, range 20. The soil is a black loam and clay subsoil, suitable for farming purposes. The surface is level and covered with thick poplar and willow. There is no timber. There are no hay lands. Namepi river flows through the southwestern part of the township. The water in the sloughs is fresh. There are no water-powers. The climate was cold and wet at time of survey (July and August) with no summer frosts. The fuel is dry poplar in abundance. No coal was found. No stone quarries were observed. There are no minerals. The game is moose, deer and ducks.—*J. C. Baker, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 20—Continued.

64. *North outline.*—This township is covered with small isolated patches of heavy timber surrounded by brule, and is well adapted for mixed farming. The surface is gently rolling and much of it would be easy to clear. There are two good creeks, one in section 35 and the other in section 33, both flowing north and both permanent, while there is a lake one and one-half miles long in section 31. A large lake which I have been told is called Skeleton lake and which appears to be five or six miles long in a southwesterly and northeasterly direction and one or two miles wide, lies about one mile to the north of sections 35 and 36.—*R. W. Cautley, D.L.S., 1907.*

Range 21.

58. We reached this township by following the Victoria trail as far as the north boundary of township 57, range 20; then by following the boundary west to township 57, range 21 we cut a trail to the northeast corner of section 16. The soil is principally black loam with clay subsoil. When cleared it will be suitable for farming. This township is level and covered with thick willow and poplar. There is no timber. There is no hay land in this township. The water in lake No. 1 is alkaline, but the water in the sloughs is fresh. There are no creeks. At the time of survey, the sloughs were full of water. There is no water-power. The weather was cold and wet during the time of survey (June and July). No summer frosts occur. Plenty of dry poplar may be had anywhere in this township for fuel. No coal was found. No stone quarries or minerals were noticed. Ducks, moose, deer and skunks were seen.—*J. C. Baker, D.L.S., 1906.*

64. *North outline.*—This township is covered for the most part with thick second growth poplar and grey willow, small and easily cleared, with isolated patches of dry spruce or green tamarack from four to twelve inches diameter, and is well suited to the needs of settlers who desire to go in for mixed farming, being near to Athabaska Landing and having egress thereto by a very fair wagon trail which crosses the line at the northeast corner of section 32. The surface is gently rolling and the soil good, much of it being in the first class. A creek, which affords a permanent supply of water, flows in a northeasterly direction across the north boundary of section 34, and two tributaries of another creek flow north across section 32, while there is a lake of about three hundred acres in extent, and surrounded by hay marshes across the north boundary of section 36.—*R. W. Cautley, D.L.S., 1907.*

Ranges 21 and 22.

68. The country is covered with much spruce swamp. The timber is generally small and of little commercial value. Areas occur which are slightly elevated above the swamp lands, but as a whole it is unfit for settlement.—*A. W. Ponton, D.L.S., 1906.*

Range 22.

11. This township can be reached from Lethbridge by a trail which passes through it, leading from Lethbridge to Bow river. The trail is in good condition and can be travelled at any season of the year. The soil of this township varies from a sandy loam to a stiff clay, though through some of the interior parts there are coarse gravel ridges. This township up to the present has been used for grazing. The soil, however, would be suitable for grain growing, if the season were at all favourable, but as a rule it has been too dry for farming. Settlers are coming in and the land is being cultivated for grain growing. The surface of this township is open, rolling prairie. No timber whatever exists on it. Upland hay can be cut from almost any part of the

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 22—Continued.

township and marsh hay can be cut about Keho lake. At the time of this present survey (May and June) there was plenty of surface water in the township owing to the excessive spring rains. A small creek was crossed running southeasterly out of section 1. Keho lake was swollen to several times its ordinary size, flooding nearly all of section 31 and parts of sections 30 and 32. Some of the farmers have dug wells, and obtained water at from thirty feet to one hundred feet. This water can be used but is more or less alkaline. Keho lake water is strongly alkaline. The only fuel is coal and is freighted in from the Lethbridge mines. One settler stated that in digging a well on section 8 he went through several small veins of coal. Coal crops out of the surface on section 18; this coal has been used by some of the settlers, but so far is not of a very good quality, as it weathers very easily on being exposed to the air. No doubt better quality would be found by going deeper into the seam. The climate is dry and no summer frosts were reported. No timber exists in this township, no water-powers, no stone quarries and no minerals except coal, as mentioned above. No game was seen.—*Lennox T. Bray, D.L.S., 1906.*

64. *North outline.*—This township is covered for the most part with poplar and willow scrub, with occasional patches of muskeg filled with spruce and tamarack from 4 to 8 inches in diameter. The surface is a high rolling plateau 250 feet above Tawatinaw river, which crosses the north boundary of section 31, in a northerly direction. A creek crosses the north boundary of section 34, and a tributary of the same creek crosses the north boundary of section 35, both flowing in a northerly direction. The Athabaska Landing wagon road and Government telegraph line cross the north boundary of section 31. Rated as agricultural land, this township is of the first and second class.—*R. W. Cautley, D.L.S., 1907.*

65. This township has been subdivided, and there are some settlers already established in parts of it who seem to be doing very well. One of them, Mr. William F. Smith, keeps a large stopping place on the southwest corner of section 6, and as an instance of the amount of travel which takes place over this road, it may be of interest to state that it is no uncommon thing for thirty freight teams to stop overnight.—*R. W. Cautley, D.L.S., 1907.*

Range 23.

64. *North outline.*—This township is for the most part covered with poplar and willow scrub, with occasional bluffs of poplar from two to four inches in diameter. There is a good deal of brulé, and the occasional stretches of muskeg are full of green spruce and tamarack from two to four inches in diameter. The surface consists of a high rolling plateau about 250 feet above Tawatinaw river, and there are several small creeks flowing across it in a northerly direction. Rated as agricultural land, this township is from first to second class and is suitable for mixed farming. The Athabaska Landing wagon road lies a quarter of a mile east of the northeast corner of section 36.—*R. W. Cautley, D.L.S., 1907.*

68. The country is broken by Athabaska river and spruce swamps, and is unfit for settlement.—*A. W. Ponton, D.L.S., 1906.*

Range 24.

64. *North outline.*—The north boundary of sections 36, 35 and 34 in this township lies principally in muskeg covered with spruce and tamarack from two to eight inches in diameter. The north boundary of sections 33, 32 and 31 traverses a rolling country covered with poplar and willow scrub and old brulé, and is suitable for

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 24—Continued.

farming or grazing, the soil being second class. There are no creeks which cross the line in these sections, but from the presence of small patches of muskeg I believe water would be readily found in summer. There is sufficient timber in the vicinity to supply the needs of settlers both for fuel and farm buildings.—*R. W. Cautley, D.L.S., 1907.*

68. The country is broken by long lakes running north and south, with high ridges between, timbered with fair sized poplar, birch and scattered spruce. This range offers good opportunities to a limited number of settlers, as hay is available in fair quantities and openings in the valleys afford pasture. A trail from Baptiste lake to Moose portage affords access.—*A. W. Ponton, D.L.S., 1906.*

Range 25.

61. This township was reached by following the main trail to Edison to the northeast corner of section 31, township 60, range 25; then following the trail due north to lac des Joncs; thence by the eastern side of the lake. The trail from the east side of the lake runs northwesterly to the northeast corner of section 19. The soil in this township is similar to that found in swamps and muskeg country. It is not suitable for farming. The surface is level, covered with poplar, spruce and tamarack. There is large spruce and tamarack from two to four feet in diameter found in sections 21, 20, 29, 30, 31 and 32. There is no hay. The water in the lakes is fresh. There is plenty of water everywhere in this township. There is one creek which flows westerly entering the township on the north boundary of section 34, and flowing through sections 34, 27, 28, 29, 20 and 19. The climate was dry and warm at the time of survey (August and September), with no frosts. Plenty of dry spruce, tamarack and poplar can be secured for fuel. No coal was found. There are no stone quarries or minerals. The game is moose, deer and ducks.—*J. C. Baker, D.L.S., 1906.*

64. *North outline.*—In this township the land varies a good deal in character; section 36 contains a long irregular-shaped lake surrounded by low broken hills from 40 to 120 feet high and is suitable for grazing rather than agriculture. Sections 35, and 34 contain so much swampy land in the vicinity of the line as to make it third class agricultural land. Sections 33 and 32 are covered with light poplar and willow scrub alternating with bluffs of poplar and spruce from three to six inches in diameter. The land in these sections is of the first class, having an undulating surface and, as far as one can judge from snowshoes, a rich soil is shown by the surface indications, vegetation and general appearance, while section 31 is covered with heavy dry spruce timber and windfalls and would seem to have a lighter soil from the vegetation and presence of second growth jackpine. There are no creeks of such a size as to be noticeable in winter in this township. Numerous tracks of dog sleighs on the lake in section 36 indicate that Indians use it as a route of travel. From a high point on the line in section 36 two lakes are visible to the north-northwest, the bigger of them, estimated to be eight miles distant, probably being Baptiste lake.—*R. W. Cautley, D.L.S., 1907.*

Range 26.

61. There is no trail into this township. In dry weather a wagon may pass through sections 24, 23, 27 and 28 by a trail made by my party. The country, however, is muskeg and difficult to pass through with wagons. The soil along the south boundary and extending approximately one mile into this township is black loam with sandy subsoil. It is suitable for farming but is covered now with thick second

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 26—Continued.

growth poplar. The rest of the township is swamp and muskeg covered with tamarack and spruce too small for timber but suitable for fence rails and firewood. It is not suitable for farm land. There is no hay land. The water is fresh. There is one large creek which flows through sections 24, 23, 26, 27, 28, 29, 32 and 31. The current is slow. There is no water-power. The climate was mild and dry during September and October, with no frosts. Plenty of dry tamarack, poplar and spruce can be obtained for fuel. There are no stone quarries. No minerals were discovered. The game is similar to that found in other parts of Alberta.—*J. C. Baker, D.L.S., 1906.*

64. *North outline.*—This township is principally covered with a thick growth of small poplar and willow, and sections 36, 35, 34 and 33 comprise land well adapted to mixed farming, having a gently undulating surface and good soil, of the first and second classes. In sections 32 and 31 the character of the country gradually changes; small ravines filled with muskeg occur, with patches of heavy timber and brulé and second growth jackpine ridges. The surface becomes more irregular and the soil poorer, so that these two sections range from second to third class in rating. A creek ten feet wide, affording a permanent supply of water, occurs in section 36, and a small creek flows into a marshy pond, to the north of the line, in section 31. There is an abundant supply of timber for the needs of settlers throughout this township.—*R. W. Cautley, D.L.S., 1907.*

Range 27.

58. The north half of this township is reached from Morinville by a cross country trail which leads to Sutherland's mill on or near section 5, township 59, range 26, west of the fourth meridian. Another trail running north from Riviere-qui-barre joins the first near the northeast corner of the township. The south part is reached from Riviere-qui-barre, by going through Independence. This trail strikes about the middle of the south boundary of section 3, which it follows; then after following the south boundary of section 4 for a distance of about a quarter of a mile it turns towards the northwest, leaving the township on the east boundary of section 7. The soil is light in the northern part, improving as we go south. It is a good coat of black and sandy loam over a clay subsoil, altogether suitable for farming. The surface is rolling. Sloping north for about one and one-half miles from the correction line it then drops to the south for the remainder of the distance to the south outline. Except for a part of the east boundary of section 33, which goes through a spruce swamp, the opening of the meridians for the first mile and a half was easy work through small poplar and light brush. From there large areas of poplar from four to twelve inches in diameter are often met with and along the chord north of sections 7 to 12 the brush, especially on the east, was fairly thick and the cutting heavy. The same may be said of the part of the meridians between the two southern chords, especially in the east half. Around the lake on sections 23, 24, 25 and 26 there is a large swamp growing spruce averaging about eight inches in diameter, it reaches to the south boundary of section 23. This timber is good only for fuel. The best timber, consisting of spruce and poplar from six to twelve inches in diameter, is found along the north boundary of section 22. There is on every section sufficient wood to answer all the wants of the settlers for building and fuel purposes for years to come if properly taken care of. There are small hay sloughs on nearly every section, but the most extensive ones are on section 31 and on section 16, where a large quantity of hay has been cut this summer (1906). The water is good wherever found, but the settlers mostly all get their supply from wells they have dug. There are no water-powers nor quarries, nor any minerals that I know of. The only fuel available in the immediate vicinity is wood, but there is plenty of it, especially in the southern part. A few

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 27—Continued.

partridges and some rabbits are the only game that I have seen. There is quite a number of settlers in the township and they all seem to be satisfied with the soil and with their prospects generally.—*Geo. P. Roy, D.L.S., 1906.*

59. *Southern portion.*—The northern part of this township was surveyed last year, and all that has been said about it is applicable to the southern sections or mostly all. This southern part can be reached from Edmonton through Rivière-qui-barre and from there by the trail to Sutherland's mill which is situated on or very near section 5, township 59, range 26, and from there a wagon trail runs west on the correction line. Another trail going through Morinville leads to the same mill. Both trails are in good condition. The soil is generally a fair coat of black loam over a clay or sandy clay subsoil, very well adapted to farming. It becomes lighter farther south. The surface is rolling, mostly covered with small poplar, willow brush and the half burnt remains of old windfalls. There is a chain of swamps and sloughs on part of sections 11, 10, 3, 4 and 5 which reduces considerably the area of farming land in these sections. Most of these sloughs are now dry and partly covered with willow brush, and if cleared would produce a large crop of hay. The settlers have been cutting hay there already. These sections contain also swamps growing spruce and tamarack measuring from two to eight inches in diameter. The space affected by the swamps alternating with hay sloughs is unfit for farming purposes and might be reserved for the preservation of the water supply and the fuel that it contains. Good timber, that is poplar and an equal amount of spruce measuring eight to twenty inches in diameter, is found on the quarter sections cornering on the monument at the northeast angle of section 9. Outside of these timber lands there is, mostly on every section, sufficient poplar and dry spruce for the first wants of the settlers, but unless taken special care of, wood will become scarce in a short time and fuel will have to be procured from the outside. Good water is found in sloughs which are not dry, but the settlers have dug wells which give them all the water they want, some of these wells being forty feet deep. The climate is the same as in Edmonton. There are no water-powers and I have seen no stone quarries or evidence of any minerals. Fuel, as already stated, will be scarce after a few years unless the timber that remains is economically used. Game is not plentiful. A few partridge and rabbits are all the game I have seen. Along the correction line mostly all the sections are occupied and the settlers seem to be satisfied with the soil and with their prospects generally.—*Geo. P. Roy, D.L.S., 1906.*

61. The trail into this township crosses the south boundary near the northeast corner of section 35, township 60, range 27; thence crosses sections 2, 11 and 10 to Pembina river. The soil along the river is suitable for farming, but that lying half a mile from the river is muskeg and unsuitable for farming. The country is level, covered mostly with tamarack and spruce swamp. That lying along the river is covered mostly with poplar. The timber is small in this township, except in the northwest and southwest quarters of section 10, where the spruce along the river is large, being from one foot to three feet in diameter. Some hay meadows are found on the west side of Pembina river. They are small. The kind of hay is redtop. The water in the sloughs and lakes is fresh. Pembina river is fresh water. Bath creek which enters the township near the northeast corner of section 35, township 60, range 27, flows northwesterly and empties into the Pembina. The climate is cold and damp in October and November. There are no summer frosts. There is plenty of dry tamarack, spruce and poplar for fuel. No coal was found. No stone quarries or minerals were noticed. The game is similar to that found in other parts of Alberta.—*J. C. Baker, D.L.S., 1906.*

64. *North outline.*—The two and one-half miles contained in this township consist of stretches of muskeg, filled with spruce and tamarack from three to eight inches

TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 27—Continued.

in diameter, alternating with irregular sandy ridges covered with jackpine from four to eight inches in diameter. There are no creeks in it, and the land should all be rated as third class agricultural land.—*R. W. Cautley, D.L.S., 1907.*

Range 29.

13. The best route for reaching this township is from Claresholm, a station on the Calgary and Edmonton branch of the Canadian Pacific railway. To reach the southern portion of the township the trail following Trout creek is taken; while the northern part is reached by the trail following Willow creek. Both trails were in good condition, except that they were considerably drifted with snow at the time of my visit (November). The soil is generally of second quality, being a clay or sandy loam, with clay subsoil, and from the excellent crop of grass all over the hills would appear to be very fertile, but owing to the very hilly character of the surface it is best adapted to cattle and sheep grazing. The surface is very hilly prairie, the township being crossed by Trout creek at the south and Willow creek along the north. The north side of the divide in section 18 is covered with willow scrub and a small amount of poplar and cottonwood and a few spruce, the north halves of 17 and 18 being about one-third timbered. Along the west shore of Caron lake the surface is covered with a heavy growth of willow scrub, with a few poplar, pine and spruce, and along the east boundary of sections 2 and 11 were several patches of scrub. The only timber observed was in the southwest corner of section 6. Here there is a small tract of fir, spruce and hemlock, the fir ranging from two to three and one-half feet diameter and the spruce and hemlock four inches to two feet in diameter. This covers one-third of the west half of the southwest quarter of section 6. Hay could be cut almost any place in this township not covered with scrub or timber, and is of the arrow or spear grass variety, but at the present time it is cut chiefly in the valley of Trout creek, where the growth is most luxuriant, but the quality inferior to that on the hills. The water is all fresh, Trout and Willow creeks being spring streams, while several smaller streams fall into these creeks, rising in the interior of the township. The supply is apparently sufficient and permanent. Trout creek is ten to twenty links wide, one to three feet deep, current two and one-half to three miles per hour, and the valley is flooded during spring freshets from one to three feet. As I did not cross Willow creek in this township I can give no information regarding it. There are no water-powers on Trout creek. The climate is said to be warm during the summer months, and generally mild winters with little snow but subject at all times to very high winds. The fuel most easily available in this township is wood—poplar, fir, spruce and cottonwood, and can be procured along the creeks and in the southwest portion of the township. No coal or lignite veins were observed in the township. There are no stone quarries. Outcroppings of sandstone were observed around the lake at the southeast corner of the township, but it was very difficult of access. No minerals of economic value were found in this township. Chickens, foxes, coyotes were quite numerous, with a few deer and wolves, and ducks and geese during the period of open water, and the streams are well supplied with mountain trout, of which there are two varieties.—*A. H. Hawkins, D.L.S., 1906.*

Range 30.

1. A good wagon road known as the Oil City trail leads from Pincher Creek into this township. The soil is gravelly and not adapted for agricultural purposes. The surface is very broken by high bare mountains. The valley of Oil creek, which varies from a quarter to a half mile in width, is more or less timbered with spruce, pine and balsam in all sizes. The water is fresh and the supply plentiful. A water-power could

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 30—Continued.

be developed from Oil creek. The fuel is wood and can be procured from any section. No hay exists in this township. Good limestone can be had from almost any section. The game is deer and brown bear. Mountain trout are also plentiful. The only mineral found was crude oil. The Rocky Mountain Developing company have completed drilling a well on the northeast quarter of section 30, from which they can pump a small quantity of oil. They have another well nearly completed on the same quarter and an outfit ready to start in a second well on the same quarter. The Oil City townsite is laid out partly on section 25, township 1, range 1, west of the 5th meridian, and partly on section 30, township 1, range 30, west of the 4th meridian. Spruce, balsam and pine timber, in small sizes, is plentiful throughout the township. Trees up to thirty inches in diameter were found on the southwestern part of section 25, and on section 11. There is, however, no large quantity of this heavy timber. The climate is very changeable and no doubt summer frosts do occur.—*Lennox T. Bray, D.L.S., 1906.*

3. *Sections 13, 24, 25 and 36.*—These sections lie only a couple of miles west of Twin Butte, and can be easily reached from it by good trails which lead into and near these sections. The soil is of a good quality, being a deep rich loam with a clay subsoil. It would be suitable for grain growing, but owing to the high altitude of the locality it is very difficult for the grain to ripen. The surface of these sections is rolling and mostly covered with thick scrub willow and poplar. Poplars are found up to six inches in diameter. There are a few sloughs and open ridges throughout these sections. The water in some of the sloughs is fresh, while in others it is brackish. Several good spring creeks flow easterly across sections 13 and 24. The climate of this locality is apt to be very changeable, owing to it being so near the mountains. Summer frosts occur. The fuel used is wood, and can be procured from some of the canyons leading into the mountains about three or four miles west of these sections. No water-powers were found in these sections. No stone quarries, no hay and no traces of minerals were found. Deer and prairie chickens are the only game. Section 13 is rolling, in its central part more or less open, on its boundaries it is covered with thick willow and young poplar. Section 24 is partly open prairie and gently rolling. Sections 25 and 36 are rolling land covered with thick willow and poplar up to six inches in diameter. There are a number of sloughs on these sections, and the northwest quarter of 36 is broken by Margaret lake.—*Lennox T. Bray, D.L.S., 1906.*

4. This township can be reached from Pincher Creek by good trails which lead into it. The soil is of a good quality, being a deep rich loam with a clay subsoil, and would be suitable for grain growing were it not for the high altitude of the locality. Some of the settlers grow very good oats and intend trying other grains. The surface is rolling and scrubby, though there is nearly as much clear land as there is scrub. There is no timber in this township except young poplar which on parts of sections 8 and 17 attain a size up to six inches in diameter. Some black poplar along Drywood river through section 8 were found up to twenty inches in diameter. Young poplar occurs in almost every section. Good hay is harvested from any of the openings in the township. A good hay meadow occurs on the south half of section 9. The water in all the streams is fresh and the supply seems to be permanent. Some of the sloughs in the southeastern part of the township are inclined to be alkaline. The fuel used is mostly wood and can be procured just west of this township in the ravines leading into the mountains. No water-powers occur in this township. No stone quarries and no indications of minerals were found. The game is prairie chickens, and a few deer were seen. The climate of the locality is very good. Although no summer frosts occur, still frost does occur quite early in the fall. This locality up

TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 30—Continued.

until the present has been used for grazing purposes. Sections 1, 2 and the east half of 3 are rolling land covered with willow scrub and young poplar. There are open areas all through these sections. Sections 1 and 2 are broken by Yarrow creek, which has high banks. The southeast quarter of 2 and the southwest quarter of 1 are broken by a lake. Section 4 and the west half of section 3 are high rolling land and mostly open. Section 5 is rolling and covered to a good extent with scrub. Sections 8 and 9 are broken by Southfork creek. Section 8 and the north half of 9 are high rolling land mostly covered with scrub and young poplar up to six inches in diameter. The south half of section 9 is mostly open and level and makes a very good hay meadow. Sections 10, 11 and 12 are rolling land and partly covered with willow scrub. Some of section 12 has been cultivated. Sections 15, 16 and 17 are broken by Northfork creek and are partly covered with scrub. Sections 21 and 22 are gently rolling land and mostly covered with willow scrub and young poplar. Section 20 is mostly open and gently rolling.—*Lennox T. Bray, D.L.S., 1906.*

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 1.

1. A good wagon road known as the Oil City trail leads from Pincher Creek into this township. The soil is gravelly and not adapted for agricultural purposes. The surface is very broken by high bare mountains. The valley of Oil creek, which varies from a quarter to a half mile in width, is more or less timbered with spruce, pine, and balsam in all sizes. The water is fresh and the supply plentiful. A water-power could be developed from Oil creek. The fuel is wood and can be procured from any section. No hay exists in this township. Good limestone can be had from almost any section. The game is deer and brown bear. Mountain trout are also plentiful. The only mineral found was crude oil. It can be seen oozing out of the banks of Seapage creek on section 25. Several prospecting outfits are working in these townships drilling for oil. The Rocky Mountain Developing Co. have part of a drilling outfit on the southeast quarter of section 25, and part of an outfit on the northeast quarter of section 14. The Pincher Creek Oil Co. are drilling a well on the northeast quarter of section 25. The Oil City townsite is laid out partly on section 25, township 1, range 1, west of the fifth meridian, and partly on section 30, township 1, range 30, west of the fourth meridian. Spruce, balsam and pine timber, in small sizes, is plentiful throughout this township. Trees up to thirty inches in diameter were found in the southwestern part of section 25 and on section 11. There is, however, no large quantity of this heavy timber. The climate is very changeable and no doubt summer frosts do occur.—*Lennox T. Bray, D.L.S., 1906.*

2. This township can be reached by a pack trail which branches from the Oil City trail just as it crosses Blakiston brook in township 2, range 30, west of the fourth meridian. By doing a little road building and driving up the bed of Blakiston brook we were able to use a wagon as far as section 9, but beyond this section it would be difficult to get a wagon. The soil of this township is gravelly and not at all adapted for any agricultural purpose. The surface is very broken by high bare mountains. There are a few small flats which are more or less covered with scrub. Jackpine, spruce and balsam grow on the mountain sides up to a certain height. The water is fresh and the supply appears to be sufficient. The fuel used is wood and can be procured from any section. There is plenty of good limestone in every part of the township. No hay of any account grows in this township, and no indications of minerals were found. The climate is very changeable, summer frosts undoubtedly do occur. The game is brown bear, deer, sheep and goats. Water-power can be developed on both

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 1—Continued.

forks of Blakiston brook by damming. On section 14 the south fork has a fall of about twenty-five feet. The timber is pine, spruce and balsam. Most of the flats and mountain sides are covered with trees from two to eight inches in diameter. On the northern parts of sections 21 and 22 our lines ran through a block of timber measuring from six to forty inches in diameter. Another block of large timber was seen to be located on about the south half of section 8. In surveying this township I was compelled to run a good many quarter section lines in order to follow the courses of Blakiston brook. The valley adjoining this brook varies in width from about a quarter to a half mile, though in places it may be narrower. My lines on both forks of Blakiston brook could have been continued about two miles farther west without any great difficulty, but on account of being called to another district I was compelled to stop where I did.—*Lennox T. Bray, D.L.S., 1906.*

15. It is about twenty miles by a fairly good but hilly road from this township to Nanton, a small but flourishing town on the Macleod extension of the Calgary and Edmonton branch of the Canadian Pacific railway. Another trail from Stavely, also a town farther south on the same line of railway, joins the former trail a few miles east of this township. The soil is composed principally of a black loam, varying in depth from three to eighteen inches with generally a clay subsoil. On the hills and ridges the soil is stony and gravelly. It is suitable for the growth of any crops peculiar to this latitude, providing the climatic conditions are favourable. The surface is very hilly and is partly prairie, but mostly bush and brush. The timber still standing is somewhat scrubby. There has been some very good timber, such as banksian pine, spruce and poplar. The best of it, however, has already been cut. There was a portable sawmill just south of the south boundary of section 1, which has since been removed to another locality. The settlers forty and fifty miles to the east have also for some years past been cutting the best of the timber for their necessary farm buildings. There are no regular hay meadows, but the herbage along the sidehills and valleys attains a luxuriant growth and makes excellent hay. It is a mere matter of humidity, as when there is plenty of rain there are good hay crops, without any irrigation. If, however, it happens to be a particularly dry season, irrigation ditches are made use of. The water found here is of a superior quality, as many springs take their rise in the hills. At the time of my survey they were running strong, and showed no signs of being easily exhausted. There are no water-powers in the township. The climate, owing to the altitude, and the close proximity of the mountains, is not favourable for the ripening of cereals, and only the hardiest kind of roots or vegetables do well. So far there is plenty of fire-killed timber for fuel, but coal may be obtained at no great distance in the foothills. There are no stone quarries, but stone may be procured on the ridges, in the future, if required. No minerals, of any economic value, were found. Game also is scarce, only a few grouse or partridges having been observed. Taking into consideration the vigorous growth of the grasses and the fact that the climate is unfavourable for the ripening of cereals, it is plain that this township is more adapted for cattle-raising. The herbage for pasturage is in abundance and although the winters at times may be severe, with sufficient care and a good supply of provender for exceptionally bad seasons, no heavy losses may be anticipated. As a rule, horses do not require to be fed during the winter months, provided they have the run of new pasture, even if the snow is deep, as they can rustle or paw, but cattle, if a crust forms on the snow, require to be fed. Fortunately, even after a heavy fall of snow, a chinook may spring up and thaw the snow, and thus enable the cattle to rustle their own sustenance, without any particular effort on the part of the cattlemen. When hay is not very abundant a snow plough may be used, to clear the prairie for the benefit of the calves. A number of settlers have come in within the year, and nearly all are provided with the means of sustenance, having brought a number of

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 1—Continued.

cattle along. Those that have no cattle are getting a start by working out for wages. They are a very desirable class of settlers.—*C. F. Miles, D.L.S., 1906.*

Range 2.

5. This township is reached from Pincher Creek by a good wagon road which passes through it leading to the oil wells on the south fork of Oldman river. The soil is more or less gravelly, and is best suited for grazing, though a number of settlers are trying to farm it in small patches. The surface is very rough and broken, though there are some small flats which are not. It is covered mostly with scrub poplar, jackpine and spruce which will be mentioned below. Good hay is cut on parts of sections 8, 21 and 29, and the open slopes of some of the hills. This township is exceptionally well watered by numerous spring creeks, which afford the best of fresh water. Mill creek runs northerly through the eastern tier of sections. Gladstone creek runs northeasterly across the southern and central part of the township. Beaver creek runs northeast across the northwestern part of the township. Mill creek has been used for driving timber, and with a few dams Gladstone creek could also be used. The climate is very changeable and summer frosts occur. Plenty of limestone could be quarried out of the banks of Mill creek, and in various parts of the northwest part of the township. The fuel at present is wood, which can be procured from almost any section. Coal shows itself in the north bank of Gladstone creek near where it empties into Mill creek. No other minerals were seen. The game is black-tail deer and brown bear. Sections 13, 24 and 25 are broken by Mill creek, and are mostly timbered west of the creek. Section 35 is rolling land covered with a thick growth of poplar. Section 26 is rough and broken in its west half; the east half is open, nearly level land. Section 23 is open through its central part, but rough and covered with timber in its northwest and southern parts. Section 14 is sloping, rolling land covered with spruce, pine and poplar. Section 15 is more or less open. Sections 16, 17 and 18 are high rolling land, covered mostly with spruce up to ten inches. The south slopes of the hills are open in patches. These sections slope to the north. Sections 19, 20, 21 and 22 are rough and high rolling land covered mostly with spruce and poplar. Spruce measuring up to fifteen inches in diameter covers the central eastern part of section 21. Section 27 is very rough and broken by hills. Good timber up to twelve inches in diameter is to be found on it. Section 28 is partly open in the southeast quarter; the southwest quarter is very rolling, and covered with pine and spruce up to six inches in diameter. The north half is very rough and broken. Spruce up to twelve inches in diameter is found on it. The east half of section 29 is rough, rolling land, lightly timbered; the west half is partly open. Section 30 is high, rolling land covered with spruce, pine and poplar up to eight inches in diameter. Section 31 and the north half of section 32 are very rough, and broken by high bare hills. Good timber grows in the ravines. The south half of section 32 is sloping, rolling land, covered with a good growth of spruce and pine up to eight inches in diameter. A part of the southeast quarter is open level land. Section 33 and the west half of section 34 are very rough, and broken by high hills and ravines. The east half of section 34 is rolling land covered with a thick growth of poplar. All through this township the south slopes of the hills were less wooded than the north slopes, and in most cases the timber was young poplar.—*Lennox T. Bray, D.L.S., 1906.*

13. This township may be reached by a fair trail from Nanton or Stavely, on the Calgary and Edmonton railway, about thirty-five miles distant. The soil in the bottom lands consists of a rich black loam, which, if climatic conditions permit, could produce any crops. A high ridge traverses the centre of the township; there are two gaps, through which Langford and Westrup creeks flow into the south branch of

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 2—Continued.

Willow creek. Another high rocky ridge cuts through the easterly tier of sections. Similarly, other rocky ridges cut through the westerly half of this township. The valley between these ridges furnishes excellent pasture, and in the open parts many hundreds of tons of hay are cut by the ranchers for their cattle. The ridges are more or less covered with timber, some of which is of considerable size, such as spruce and jackpine; some good fir is also to be met with. Much of it has already been cut by settlers and ranchers from a distance, but there is still a bountiful supply for future needs. A luxuriant growth of grass is found on nearly all the uplands. The supply of water in the creeks appears to be unlimited, and is of good quality, apparently but little impregnated with alkali. There are no available water-powers. With regard to the climate the reports are contradictory. Each one interviewed makes his statements to suit his own interests. Ranchers affirm that no crops, either cereal or roots can be grown here, whereas settlers maintain the contrary. Of fuel, there is a plentiful supply in the hills for years to come, consisting of poplar, spruce and jackpine. Coal too, may be procured at no great distance. There are no quarries being operated. Minerals of economic value were not observed. With regard to game, it is being rapidly exterminated by the Stony Indians, who are in the habit of hunting to the west of this township in the early winter. Some of them, a part of a large band, called at my camp to dispose of some of the deer they had killed in this vicinity. The valleys of this township are pretty well settled, but owing to some differences between the ranchers and settlers, it is possible that the latter may have to abandon their homesteads and improvements and look for land in some other locality. All in all, I consider this township essentially a cattle country.—*C. F. Miles, D.L.S., 1906.*

14. Fairly good, but very hilly trails reach this township from Nanton and Stavely—about twenty-five miles distant—two small but flourishing towns on the Macleod extension of the Calgary and Edmonton branch of the Canadian Pacific railway. The nearest post office is Willows, on section 12, in township 14, range 1, on Willow creek, where there is a weekly mail from Nanton. The soil, generally, is a rich black loam varying from three to eighteen inches in depth, with clay subsoil. On the hills and ridges it is mostly gravelly and stony. It is suitable for raising any crops indigenous to the altitude, provided climatic conditions are favourable. The surface is mainly hilly, high ridges traversing the township from south to north with intervening valleys. A fine valley occupies parts of sections 2 and 3, 10 and 11, 15 and 14 and sections 22 and 23. There is also the valley of Willow creek, which lies in parts of sections 25, 26, 27 and 28. Another valley runs from south to north through the easterly halves of sections 4, 9, 16 and 24, but it is more or less swampy and brushy. Timber is chiefly found along the side hills, but not in sufficient quantities to be of a marketable value. It consists of poplar, banksian pine and spruce. On the tops of the ridges generally some Douglas fir is to be found, and although sometimes quite large, it appears gnarled and stunted. A considerable quantity of hay is cut in the valley, wherever it is clear of willow scrub and sage brush. There are no water-powers, stone quarries or minerals of economic value. The climatic conditions are not favourable for the ripening of cereals, and no attempt seems to have been made in this direction owing to the prevailing summer frosts. The hardiest kinds of vegetables and roots might ripen, but it is doubtful if potatoes would. For fuel there is an abundance of fire-killed timber along the side hills, and in some of the ravines. Game is not plentiful. Some grouse and partridges were observed, and there were signs of deer. The creeks, however, are well stocked with different varieties of trout and grayling. The water from the springs rising in the hills or ridges is pure and palatable, as is also the water in Willow and Rice creeks, which are fed from the springs. An old deserted cow camp in section 28 has again been taken possession of by some cattlemen. They have both cattle and horses, and they cut

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 2—Continued.

a large quantity of hay last summer on sections 27 and 28, mostly on the uplands. A rancher on section 10 has not been in possession many years. He cuts his hay on the easterly halves of sections 3 and 10. The settler on the southwest quarter of section 14 has but a small number of horses. He is quite a new arrival, and cuts his hay on his own claim. These are the only settlers in this township. The beef raised here, as is the case in the other townships of my survey, is of a superior quality. I have frequently seen cattle as fat as if they were stall-fed. There are numbers of herds of Galloways which appear to thrive exceptionally well on the herbage prevailing here.—*C. F. Miles, D.L.S., 1906.*

15. *Southern part.*—There are fairly good wagon roads from Nanton to this township, Nanton being a small but growing town on the Macleod extension of the Calgary and Edmonton branch of the Canadian Pacific railway. It is only about twenty-five miles by the trail which is good for loads almost the year round. Going by the north trail is somewhat longer, but the heaviest hills on the south trail are avoided. The soil is a black loam with generally a clay subsoil. It might produce anything peculiar to this latitude, were the climate favourable. The surface is hilly, partly timbered and scrubby, with willow growing densely in many places, and of such dimensions as to make them suitable for fence posts. Where, however, there are openings, there is generally a luxuriant growth of grasses. The timber, except for fencing and other similar purposes, has no marketable value. There are no hay meadows in the area surveyed by me during the past season, with the exception of a small area along the south boundary of section 3, the hay required by the cattlemen being cut mostly on the uplands. There is good water from the springs which take their rise in the hills. Many of these springs empty into the ponds on sections 8, 9 and 16. These ponds cover quite a large area. They are shallow, with muddy bottoms, and are not easily approached by cattle. They are full of weeds floating on the top of the water, and are surrounded by swamps. The water from the springs is pure and palatable, but in the ponds it is impregnated with decayed vegetable matter. There are no water-powers. The climate is not favourable for the ripening of cereals, and only the hardiest of vegetables or roots arrive at a state of maturity. Oats may be grown for green feed, but will not ripen generally. Potatoes were cut down by frost on the morning of August 4 in three different localities. There is sufficient fire-killed timber for fuel for immediate requirements, and coal may be obtained at no great distance in the foothills. There are no stone quarries, nor were minerals found of any commercial value. Game is becoming scarce; grouse and partridges were seen occasionally, and signs of deer were observed. In conclusion I may say that the climatic conditions are not favourable for general farming purposes, but owing to the abundance of nutritious herbage it is an ideal cattle country. Horses may run at large all the year round and thrive, but cattle require to be fed in severe weather, when a crust has formed on the snow. In such cases it is necessary to have hay provided, more particularly for the younger animals. In ordinary seasons any quantity of hay may be obtained, but in dry seasons irrigation has to be resorted to.—*C. F. Miles, D.L.S., 1906.*

Range 3.

5. The best route for reaching this township is by a wagon trail from Pincher Creek, which runs generally in a southwesterly direction from that town. It can be travelled only in the summer and winter months, the mud being too deep after the road thaws in the spring. During the months of June and July Beaver creek is very high, due to the melting of the snow in the mountains, and in consequence of it being necessary to ford this stream many times, some difficulty might be experienced

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 3—Continued.

in going over the road at that season. Occasionally the high water will make the road impassable. The soil in this township consists of black loam or sand with a clay subsoil. A few vegetables can be grown, but the land suitable for agriculture is very limited on account of the mountainous nature of the country. It is suitable for lumbering and mining. The best tracts of timber consist of spruce and pine from twelve inches to thirty-six inches in diameter, but have already been purchased by lumbermen. There is also evidence of the presence of petroleum, but whether it will be found here in paying quantities remains to be determined. There are a few sloughs which produce a coarse hay, but they cannot be said to produce it in any quantity. The country also affords as fine a horse range as can be found in western Canada, there being a good growth of bunch grass on the hills, and a never-failing supply of excellent water. The south fork of Southfork river runs through the centre of the township. It is a large stream and flows at the rate of about five or six miles an hour, with a large volume of water. The low lands adjoining this stream may be flooded at times during extremely high water. The rain and snowfall in this valley is very great. The precipitation might easily amount to one hundred inches during the year. Five hundred horse-power could easily be developed by the construction of a dam in this stream. I spent only parts of the months of October, November and December in this locality and therefore cannot at present, speak positively with regard to summer frosts, but I was told by settlers that they have experienced light frosts during the summer. Stone might be quarried in some places, but the soil is too deep to admit of any being exposed to view. There are quantities of speckled trout in Southfork river averaging about two pounds. There are some fur-bearing animals such as beaver, mink, rabbits, lynx, also a few red deer.—*W. F. O'Hara, D.L.S., 1906.*

6 and 7,, Parts.—These parts can be reached by a trail which branches to the south from Crowsnest trail on section 16, township 7. It has been used as a wagon road at some time, but the bridges on it now are unsafe. Pack horses afford about the only means of reaching these sections. The soil of these sections is a sandy loam and would be suitable for grazing. The surface is very broken and mountainous as will be described below. The only hay is the grass on the open side hills. The water is fresh and the supply apparently sufficient. The climate is very changeable, and there are summer frosts. The fuel is coal and wood. Coal has been mined on section 31 and wood can be procured from any section. Plenty of limestone can be quarried on any of the sections. No game was seen. No water-powers occur on these sections, and no traces of minerals outside of the coal mentioned above. Section 19 is rough and broken by mountains. A valley containing jackpine runs southeasterly out of it. Sections 30, 31 and 32 are broken by mountains; a valley runs northerly through sections 30 and 31, the higher end of which is mostly open, but on the north half of 31 it is timbered with young jackpine and spruce. A coal mine has been worked on the north half of 31, and several empty buildings stand in the vicinity. The side hills of these sections are mostly bare rock. Section 32 lies mostly up on the hills; it is very rough and is covered to a great extent with jackpine and spruce up to ten inches in diameter. The central southern part of section 6 is mostly a valley timbered with spruce and jackpine, the rest of the section is very rough and broken. Sections 7 and 8 are very rough and broken; they are mostly covered with spruce and jackpine up to ten inches in diameter. Section 5 is rough and broken in its west half and generally covered with spruce, pine and poplar. Byron creek flows through the northwest quarter section 31 and easterly through the south halves of sections 5 and 6. An old wagon road leading as far as the coal camp passes through the south halves of sections 5 and 6. There has been a railway right-of-way brushed out on parts of sections 6 and 31.—*Lennox T. Bray, D.L.S., 1906.*

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 3—Continued.

8. There is a pack trail leading from Frank, which crosses the mountain running northeasterly through the township. The soil is more or less gravelly though in places a deep rich loam is found. The surface is rough and scrubby in the parts surveyed, as will be explained below. Pine and spruce timber can be got from the ravine leading into the mountains. Hay has been harvested on parts of sections 23, 24, 25, 26, 35 and 36. The water is fresh and there is a good supply. The fuel used is wood and can be procured from some of the ravines leading into the mountains. Stone is plentiful along the mountains. No minerals were found. Those parts of the township lying west of the Livingstone range of mountains can be reached by a wagon road which runs from Frank to Lille. These parts are very rough and have been timbered, but the timber has mostly been burned. No game was seen. The parts east of the Livingstone range of mountains are well adapted for ranching purposes. The climate is changeable and summer frosts occur. Sections 25 and 36 are open and lie mostly up on high bare hills. Parts of the north half of 36 have been improved. Breaking has also been done on the northern part of 25. Sections 23, 24, 26 and 35 are rolling and mostly open but scrubby in patches. Several small lakes occur on the east half of section 35. Sections 2 and 3 are rough and lie mostly up on bare hills. Section 2 is scrubby in its northeast quarter and section 3 is scrubby in its central southern part. Section 11 is rough and broken in its northwest quarter, the remaining quarters are rolling and partly covered with scrub. The southwest quarter of section 14 is very rough, while the southeast quarter is rolling, scrubby land. The southeast quarter of section 10 is rolling and partly covered with scrub. A part of this quarter is cultivated. The remainder of section 10 and the south half and northwest quarter of 15 are mostly open and lie high up on the side hills. The east halves of sections 4, 9 and 16 are very rough and broken and reach to about the summit of the Livingstone range. The east halves of sections 6 and 7 are very rough and broken and covered with standing burnt young spruce. The west halves lie well up on the side of Goat mountain and are very rough. The west half of section 18 is very rough and lies upon the side of Goat mountain. It is covered with burnt young spruce. The east half is rolling and has been mostly cleared. Section 5 is very rough and broken by hills and covered with burnt young timber. The west halves of sections 8 and 17 are very rough and covered with burnt timber in the south, while fine large green spruce and pine cover the northern part of the northwest quarter of section 17 and the southwest quarter of section 20. The east halves of sections 8 and 17 are mostly bare rock and lie well up on the mountains. Soft coal is found in abundance west of the Livingstone mountains. The Frank and Lille railway runs up the Gold Creek valley which is mostly timbered.—*Lennox T. Bray, D.L.S., 1906.*

9. There is a pack trail leading from Frank, which crosses the mountain on section 4, and thence northeasterly through the township. The soil is more or less gravelly though in places a deep rich loam is found. The surface is rough in the parts surveyed and scrubby, as will be explained below. Pine and spruce timber can be got from the ravines leading into the mountains. Hay has been harvested on parts of sections 1 and 2. The water is fresh and there is a good supply. The fuel used is wood and can be procured from some of the ravines leading into the mountains. No minerals were found but prospectors report having found good magnetic iron ore on section 21. Those parts of the township lying west of the Livingstone range of mountains can be reached by a wagon road which runs from Frank to Lille. These parts are very rough and have been timbered but the timber has mostly been burned. No game was seen. The parts east of the Livingstone range of mountains are well adapted for ranching purposes. The climate is changeable and summer frosts occur. Most of the east halves of sections 1 and 12 and the southwest quarter of 1 lie in a valley which is partly covered with scrub. The soil here is good. The south half and

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Range 3—Continued.

central northern part of section 2 and the central part of section 11 are in a rolling valley. Open areas occur in this valley but the surface is mostly covered with willow and poplar scrub. The remaining parts of these sections are very broken by high bare hills.—*Lennox T. Bray, D.L.S. 1906.*

11. The best route for reaching this township is to leave Cowley station, on the Crowsnest branch of the Canadian Pacific railway, travelling north to Oldman river, and along Oldman river through the Gap, to Livingstone river. The soil is a black loam covering sand in the flat valley of Livingstone river. It would be suitable for the growth of cereals except for the heavy frosts in summer. The valley of Livingstone river in this township is a narrow prairie, timbered in the northern portion of the township with pine, small poplar and willow scrub. The pine and spruce is from six to ten inches. In the flat valley there is a good quality of hay. The water is fresh and very clear; the supply is sufficient and permanent. Livingstone river varies from fifty links to two chains and fifty links in width, and from three links to fifteen links in depth. It has a probable average width of seventy-five links and a depth of four links, with a flow of nearly four miles an hour. It seems improbable that the land could be flooded. Livingstone river is available for the development of horse-power. It is nearly a continuous rapid in this township. Power could be developed by the construction of dams. The climate is very dry. The inhabitants say there is frost every week, with the exception possibly of one or two weeks in August. Fallen timber on the mountain and hill sides would supply fuel. On the east boundary of section 7 there is a seam of bituminous coal forty links in width at least. No stone quarries or minerals of economic value were observed. The game consists of a few partridge and prairie chicken, antelope, mountain sheep and bear. Livingstone river is fairly teeming with salmon trout.—*A. L. McLennan, D.L.S., 1906.*

12. The best way to reach this township is to leave Cowley station on the Crowsnest branch of the Canadian Pacific railway, travelling north to Oldman river, and along Oldman river through the Gap, to Livingstone river. It is nearly all sand, suitable for the growth of pine. The surface is mountainous, timbered with spruce, fir and small poplar. On the western portion of the township there is spruce and pine up to ten inches. There is no hay. The water is fresh, and the supply seems to be permanent. Small rapid streams flow into Livingstone river, varying in width from ten to twenty links, and two links in depth, with a strong current. The land could not be flooded. The water-power in these creeks could not be developed. The climate is very dry. The inhabitants say there is frost every week, with the exception possibly of one or two weeks in August. Dry fallen timber on the mountain sides is readily available for fuel. I saw no coal or lignite in this township. The summit of the mountain is composed of sandstone and conglomerate. Hematite in the form of kidney-shaped specimens were found in the bank of Livingstone river. A few partridge and prairie chicken, antelope, mountain sheep and bear were the game seen.—*A. L. MacLennan, D.L.S., 1906.*

17. A good trail from High River reaches this township. High River is a flourishing town on the Calgary and Macleod extension of the Canadian Pacific railway, about thirty miles distant. As my work consisted of subdivision of only parts of the southerly two tiers of sections, my remarks will apply mainly to that part of the township. Generally speaking, the soil consists of a rich black loam, varying in depth from six to eighteen inches along the flats and side hills. On the higher elevations it decreases in depth, and on the summits of the hills rock is frequently exposed. The soil is fit to raise any crops, if climatic conditions are favourable. It is a hilly

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Range 3—Continued.

township, though there are some fine flats along Pekisko creek, which is bordered by a fringe of timber. The remaining parts are alternately open prairie and willow brush, the former predominating. The timber bordering Pekisko creek is poplar and balm of Gilead up to about eighteen inches in diameter. There are no hay meadows of any account, the hay being principally from the uplands, where the grass grows luxuriantly. This township is well watered by creeks and springs, the principal stream, Pekisko creek, traverses sections 3, 2, 1 and 12, averaging about a foot in depth and about one chain in width. It does not appear liable to flood to any extent. No water-powers are available, or could be developed without great expense. The climate is not favourable for ripening of crops, and the settlers seldom attempt to grow anything, except for green feed, owing to summer frosts prevailing. Fuel might be obtained in the townships to the west, where timber appears plentiful, but coal is found and mined in several places along the banks of Highwood river, in the adjoining townships to the northeast. There are no stone quarries in operation, but the country rock is found frequently exposed in the hills, and might be utilized for building purposes. No minerals of economic value were observed. The only kind of game noticed was prairie chicken, but fish (different varieties of trout) appear plentiful in Pekisko creek. This part of the district is essentially a grazing country, and cattle as well as horses appear to thrive on their pasturage. Most of this land appears to be under lease, so no new settlers may be expected to come in. The pasturage can therefore be more conveniently regulated according to the requirements of those interested.—*C. F. Miles, D.L.S., 1906.*

18. This township is comparatively easy of access by trail from High River, a station and town on the Calgary and Macleod extension of the Canadian Pacific railway. Trails also from the north, from Lineham and Millarville, and from the south from Pekisko offer easy access into this township. The trail from High River has recently been diverted into road allowances and on that account, during very wet weather is somewhat impassable, as it proved to be at the time of my survey (May). The valley of Highwood river extends from one-half to three-quarters of a mile north of the river. There are no bottom lands adjacent to the river, the lowest being about seventy-five feet above the water level. The higher flats form excellent hay lands, those nearer to the river, of a somewhat lower level, afford good grazing; the soil, however, is gravelly and stony. The north boundary runs along a range of high hills. South of the river the soil consists of black loam varying in depth from six to eighteen inches, with generally a clay subsoil. South of the river the land rises gradually for a couple of miles, covered in many places with a more or less dense growth of willow. From here to the south boundary it is more open and hilly, with a gradual descent to the south boundary, affording excellent pasture for both cattle and horses. Along the south side of Highwood river there are some small groves of spruce and also of poplar, the former attaining a diameter of about twelve inches. There is no more timber than is required for the needs of the incoming settlers. There are a few hay meadows, but most of the hay is obtained from the uplands. Highwood river is not easy of access for cattle owing to its precipitous banks. There are numerous springs however, and small creeks, taking their rise in the hills, both from the north and south, containing good water. There are no water-powers available. The climate is not favourable for raising crops to any extent, although potatoes and vegetables have been grown successfully in some of the eastern sections. Frosts, however, prevail during most of the summer months. There is sufficient dead timber, fire-killed, as well as small poplar for fuel, but there is also an unlimited supply of coal now being mined, immediately to the east of this township. No stone quarries were located, although rocks are exposed in various places in the river cutbanks. No minerals of economic value were observed. For game, there are grouse, chickens and rabbits, and

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Range 3—Continued.

the river is well stocked with trout of different varieties. Taking everything into consideration, this township may be considered as excellent for stock-raising, but not for general farming.—*C. F. Miles, D.L.S., 1906.*

19. Fair trails from either High River or Okotoks reach this township. Both these places are stations on the Calgary and Macleod extension of the Canadian Pacific railway, and are within twenty miles of this township. A surveyed trail traverses sections 12, 13, 14 and 23, which, however, is almost impassable. Consequently settlers have adopted a trail following the ridge through sections 12, 13, 24 and 26; this, however, may be closed at any time by incoming settlers fencing their claims. The soil consists of a rich black loam and is well adapted for growing any kind of crops, provided the climatic conditions are favourable. The surface is hilly and rolling, partly prairie, the easterly two tiers or two and one-half tiers of sections being more particularly scrubby. South of Tongueflag creek the township is covered in part with a dense growth of large willow. The remaining westerly part is more wooded; both spruce and poplar are found, reaching up to eighteen inches in diameter. The timber, however, is not in sufficient quantities or of large enough areas to be set apart as timber berths, but should be reserved for the need of settlers. Most of the hay used here is cut on the uplands. Some of the lands along the surveyed trail would produce good hay. The trail is located along a valley, but is almost impassable on account of its swampy nature, and because of the springs that rise in the hills to the east and overflow this valley in places. This township is well supplied with water both by springs and creeks, Sheep river traversing the northwest quarter and Tongueflag creek traversing the southerly second tier of sections. The water is somewhat alkaline. The climate is not very favourable for the ripening of crops; some vegetables thrive and oats are found to ripen in some seasons, but on the whole, this township may be pronounced as being better adapted for stock-raising than for the growing of cereals. A good many cattle are being pastured here already, and with other settlers coming in, the number will be increased. Fences will be erected, which will limit the area for pasture very considerably. It is possible, that with the cultivation of the soil summer frosts may be eliminated, as has been the experience of settlers in the other provinces. So far there is a plentiful supply of fuel within the limits of this township. If this should be exhausted through destructive fires, there is an unlimited supply of coal to the north of this township, and also, according to report, on Sheep river to the west. There are no stone quarries in operation, but rock is exposed in various places along the cutbanks of Sheep river. No minerals of any economic value were observed. With regard to game, mountain grouse and prairie chickens, also rabbits and a few ducks were observed. Deer tracks also were seen occasionally.—*C. F. Miles, D.L.S., 1906.*

20. This township may be reached by a fairly good wagon road from Okotoks, a flourishing town on the Calgary and Macleod extension of the Canadian Pacific railway, about fifteen miles distant. A good wagon road also leads to Calgary by way of Millarville and Priddis, about thirty miles distant. The soil consists of a black loam varying from six to eighteen inches in depth, (the deeper predominating) with clay subsoil. It is suitable for the cultivation of any crops peculiar to the latitude provided the climatic conditions are favourable. In parts, potatoes and other hardy vegetables, as well as oats and barley have been grown successfully. The surface is hilly and rolling, frequently timbered with small groves of poplar and spruce on the northerly exposure of the hills, where it is also generally springy; scrub willow prevails to a greater or less extent on the low lying lands. The timber in a few instances reaches up to twelve inches in diameter. There is, however, no more than is

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Range 3—Continued.

required for the needs of the settler. There are no hay meadows of any extent, much of the hay being made on the uplands. Water appeared plentiful at the time of my survey (June), it having been a very wet spring. The creeks were running and some fine springs were noticed on the hillsides, the water being of a very good quality. There are no water-powers within the limits of my survey. During my stay of about two weeks in this township, there were no frosts, and I concluded that climatic conditions might be more favourable for the raising of crops in the eastern than in the western half. Areas for pasture are becoming very limited, and it will be but a very short time before this township is overstocked. For fuel there is at present quite an amount of standing timber, partly fire-killed, but a good quality of coal is found and mined within a convenient distance in the adjoining townships to the east. There are no stone quarries in operation, nor were there any minerals of economic value observed. A coal seam has been worked in Sheep river in the southerly part of this township, but since abandoned. As for game only a few chickens and partridges were observed. I find that men with families, who came in here with very small means, have arrived at a state of comparative affluence by hard work and economy in a very few years. Their horses and cattle are not roaming at large; they have quite a few head of milch cows, and sell a considerable amount of butter every week, also poultry and eggs, and raise sufficient vegetables for their own use as well as for market in the nearest town or village. They are now living in the enjoyment of the fruits of their labour and enjoy greater comforts than even they knew before they settled here. The female members of the families are even more enthusiastic about their life and interests than the male members. Yet none had to work so hard or suffer the same privations as the old settlers in the one-time backwoods of Ontario.—*C. F. Miles, D.L.S., 1906.*

50. The easiest and by far the best route to reach this township is by the trail leading from Leduc, passing Calmar and Telfordville, and thence westerly across range 2 to the homestead of C. M. David on the southwest quarter of section 12. The trail is good throughout and has been graded from its starting point to Telfordville. Another route from Edmonton by way of Sprucegrove, Stonyplain and Mewassin would also reach this township, but owing to the lack of ferry facilities on Saskatchewan river in this neighbourhood it would serve to no good purpose during the flood season. The northern part of this township, that is to say, the two northern tiers of sections, has been overrun by fire, and is at present covered with fire-killed timber and a second growth of small poplar and scrub. The top soil has disappeared, leaving the clay exposed. Its surface is for the most part heavily rolling. The central zone of this township is partly open, with a few islets of green poplar of eight inches diameter. The soil is of a fairly good quality, consisting of a layer of black sandy loam overlying a clay subsoil and suitable for mixed farming, and at present produces a dense growth of wild peas in the openings. The remainder of this township, except sections 1 and 12, where conditions are more favourable, is of a heavy rolling nature and densely covered with poplar, spruce and balsam of Gilead of a diameter of ten, fifteen and twenty inches, respectively. Lumbering operations have formerly been carried on on the flats of Saskatchewan river in sections 29 and 32, and the licensee contemplates cutting the merchantable timber in the southern part of the township during the course of the winter. This township though not very abundantly provided with natural hay, yet contains numerous small hay marshes scattered throughout the central zone. Numerous small creeks varying in width from two to ten feet and running in ravines of various depths with a permanent supply of good water, are to be found in this township. There are no streams of sufficient capacity to warrant the development of water-power. The climatic conditions are those generally prevailing in northern Alberta. No summer frosts were observed while the

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Range 3—Continued.

survey operations were being carried on (June and July). There is an abundant supply of fuel in every section, consisting of scorched poplar, balm of Gilead and large willow. A lignite vein known as 'the coal arch.' is to be seen in the cut bank of Saskatchewan river in section 29. No stone quarries and no indications of minerals of economic value are to be found in this township. The only kind of game to be seen here is black bear, and this season they have proved very troublesome by interfering with our caches.—*Louis E. Fontaine, D.L.S., 1906.*

60. This township is reached by the Dawson or Chalmer's trail which enters it on section 4 and leaves it on section 30. It is a passable wagon trail but north of Paddle river especially it requires some repairs to be in good order. The bush is too close to it and keeps it wet, muddy and soft all the time. A bridge on Paddle river is needed to avoid delays and risks when the water is high. The soil is a coat of black loam five to ten inches deep over a sandy clay subsoil which is very porous and absorbs water very fast. It is eminently suitable for farming. The surface is rolling. The two northern tiers of sections are mostly covered with small poplar and brush easily cleared. It is an old *brulé* over which fire passed again, last year probably, killing nearly all the new growth. Areas of that light poplar and brush are also found farther south, but on sections 16, 17, 8, 9, 3 and 4 the timber is heavy. Spruce is met with in nearly every section, but towards the north fire has killed the most of it and it is dry. There appear to be large tamarack swamps, on section 22 extending into 27; on sections 24, 25 and 26; at the corner of the adjoining quarters of sections 11, 12, 13 and 14, and a large one crossing the east outline on sections 12 and 13. I would recommend that these be reserved for the preservation of the water supply. The south half of section 16, the north half of section 9 and part of all the surrounding quarter sections are covered with a magnificent growth of spruce such as I have not often seen in this country. I would recommend that this spruce be reserved for the use of the settlers. The timber is sound and straight with an average of three logs before reaching the lower limbs. I would estimate that there is about two to three million feet of lumber in this area. The nearest stream is Paddle river, six miles south. There are a few hay sloughs but none of any extent that I know of. The water is good wherever found, and as there are no large streams in the township there are no water-powers to be mentioned. The climate is the same as in Edmonton. There is enough timber to supply the fuel for a few years, and outside of the northern sections enough timber could be preserved on each section to supply the wants of the settlers for years to come. I know of no stone quarries nor of any minerals of any kind. A large number of lynx were trapped on this township last winter, also some mink and bear. I have seen tracks of moose, deer and timber wolves. There are a few partridge, and rabbits are in abundance.—*Geo. P. Roy, D.L.S., 1906.*

Range 4.

10. The best route for reaching this township is to leave Cowley station on the Crowsnest branch of the Canadian Pacific railway, travelling north to Oldman river, and along Oldman river through the Gap, to Livingstone river. The soil is a black loam, with a sand subsoil in the flat valley of Livingstone river. It would be suitable for the growth of cereals, except for the heavy frosts in summer. The surface of the valley of the Racehorse branch of Livingstone river is prairie with a few spruce, pine, poplar and scrub. The pine measured up to eight inches on the southern slope of the valley. The open prairie of the valley has a good quality of hay. The water is fresh and the supply sufficient and permanent. The size of this stream is one-third the discharge of Livingstone river. The land is not likely to be flooded. This stream is almost a continuous rapid with a good deal of apparent water-power, but it would be difficult to dam the stream. The climate is very dry. The inhabitants say there is frost every week, with the exception possibly of one or two weeks in August. Fallen

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Range 4—Continued.

timber on the mountain and hillsides would afford fuel. In section 23 there is an outcrop of bituminous coal which probably runs north the extent of this township, and from the south edge of the valley appears to continue south. The coal in this township, and in the two townships immediately north of it, seems to lie on a line almost due north and south. There are no stone quarries or minerals. Game consists of a few prairie chicken, partridge, antelope, mountain sheep and bear. The fish in Racehorse river are very plentiful.—*A. L. MacLennan, D.L.S., 1906.*

11. The best route for reaching this township is to leave Cowley station, on the Crowsnest branch of the Canadian Pacific railway, travelling north to Oldman river through the Gap of Livingstone river. The soil is a black loam covering sand in the flat valley of Livingstone river. It would be suitable for the growth of cereals, except for the heavy frosts in summer. The valley of the northwest branch of Livingstone river is a narrow prairie bounded by the mountains on either side, timbered with spruce and pine. The pine is from six to ten inches in diameter, except in the valley of the northwest branch. In the valley of the northwest branch there is a good quality of hay. The water is fresh, and the supply is sufficient and permanent. The northwest branch is a very rapid stream, about one-third the volume and discharge of Livingstone river. The land would not be subject to floods. The northwest branch is practically a continuous rapid, but there is no available horse-power, as it would not be convenient to construct dams. The climate is very dry. The inhabitants say there is frost every week, with the exception possibly of one or two weeks in August. Fallen timber on the mountain and hillsides would supply fuel. In the centre of section 35 there is an outcrop of bituminous coal, which would probably extend to the north and south, through the length of this township. Also in the centre of section 14 there is an outcrop of bituminous coal. There are no stone quarries or minerals of economic value. The game consists of a few partridge and prairie chicken, antelope, mountain sheep and bear. The fish in the northwest branch is abundant.—*A. L. MacLennan, D.L.S., 1906.*

12. This township is similar to township 12, range 3, west of the fifth meridian.—*A. L. MacLennan, D.L.S., 1906.*

22. There is a good trail from Calgary to Priddis post office, a distance of about twenty miles. From there it is about four miles west over a rough, somewhat swampy trail to the east boundary of this township. From Midnapore, a station on the Macleod extension of the Calgary and Edmonton railway, it is about twenty miles. A fair winter trail runs up to about section 18 up the valley of Fish creek, but that portion that is boggy in summer is generally glare ice in winter before the snow falls. The soil generally is a black loam with clay subsoil, but it is frequently stony and rocky on the more elevated places. It produces fine pasture and good hay in the more open parts. For raising crops, I consider the climatic conditions most unfavourable. The surface is hilly and rolling, with but a small proportion of open prairie. The rest of the surface is covered with scrub—willow and second growth poplar—and some timber. The bunches of timber, yet standing, consist of spruce and banksian pine. The most important of these bunches are found on the south half of section 12, the south half of section 2, the northwest quarter of section 11, the east half of section 10, the east half of section 4, the northwest quarter of section 4, the northeast quarter of section 5, the southeast quarter of section 8, the northwest quarter of section 16, the southeast quarter of section 21, the west half of section 15, the northwest quarter of section 16, the southwest quarter of section 14, the southwest quarter of section 11, the southwest quarter of section 22, and the southwest quarter of section 21. Hay has been cut in various places along the valley of the south fork of Fish creek, more particularly on sections 11 and 12, and on sections 17 and 18 on the south side

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 4—Continued.

of the creek. This creek enters the township in section 18 and leaves again in section 12, flowing through a valley, which traverses sections 18, 17, 21, 22, 15, 14 and 12. It averages about twenty-five links in width and one foot in depth. Since it rises in the mountains, it contains a good quality of water. Another little stream called Whiskey creek crosses the southern tier of sections through a narrow valley partly timbered and partly covered with scrub. The north branch of Fish creek runs diagonally, southwest through sections 35 and 25. Besides these creeks numerous springs take their rise in the hills, and are the cause of so many swamps. The climate is not favourable for farming purposes, frosts occurring from time to time during the summer months. As far as I could learn, no attempt has been made at cultivating the soil. There is but one settler in this township. He has a house, a stable and some pasture land fenced in. He has some horses but no cattle. There are two winter cow camps, where outside ranchers cut hay and feed it to their young stock. The one situated in the northeast corner of this township I have no personal knowledge of; the other one is situated on the northeast quarter of section 18, where there is a good log house, a large log barn and a small amount of fencing. About a half dozen large hay stacks were seen here. A peculiar looking small animal was also observed here. It appeared to be domiciled under the floor of the log shack, and made considerable depredations at night among my provisions. When caught, it proved to be what is locally called a mountain rat. It had a bushy tail and large, erect, almost round ears. For fuel, any quantity of fire-killed standing timber is available. No indications of coal were observed, and no stone quarries or other minerals of any economic value. Partridge and rabbits appear plentiful, and there are also some grouse. Many deer tracks in the snow were also observed. The deer will probably be exterminated before many more years, as this part of the district is part of the hunting grounds of the Stony Indians. Trout of many varieties are said to be plentiful in the south branch of Fish creek. An Indian pack trail from Morley, a town on the Canadian Pacific railway, situated on the Stony Indian reserve, runs southwest through this township, and then south for quite a long distance. It is not suitable for wheels, but a good sleigh road might be constructed along it for winter travel, when conditions make such necessary.—*C. F. Miles, D.L.S., 1906.*

56. This township is reached by means of a trail which leaves Peace river road in township 56, range 2, opened by the surveying parties who were engaged on the preliminary surveys of the Transcontinental railway. The trail is in a very bad condition owing to numerous muskegs and swamps which have to be crossed and there are no bridges nor log crossways, so that persons teaming over the road have to spend much time brushing to make the trail passable when not frozen. The soil is a dark loam overlying a clay subsoil, and seems to be a good fertile soil suitable for all kinds of crops. The surface is rolling and covered with timber or scrub. Much of the timber attains a good size, poplar running up to fifteen inches and spruce up to twenty inches in diameter, apparently thrifty when not killed with fire. There is some white birch scattered through the poplar. More or less spruce is seen all through the township but the bulk of the timber is in the south half, and west of Oldman lake. About half of the surface has been burned over and a large proportion of the timber is dead and some of it fallen. Fire has recently overrun the north part of the township but has not done as much injury as former fires. There is little hay to be got without clearing the flats and marshy places, but there is some around the south end of Oldman lake and in spots along the creek which joins this lake at the south end. Water is abundant in ponds and small streams tributary to the creek which flows into the lake. All water is fresh and good. There are no millsites nor water-powers available. A small fall could be made by building a dam across the creek in many places, but the water supply would fail in dry weather. The climate seems favourable, with few indi-

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 4—Continued.

cations of summer frosts. Wood for fuel, of the best kind is abundant everywhere, but there are no indications of coal. The township is free from rock outcrop and but few boulders are to be seen. There are no minerals of any description visible. Game is scarce; there are a few bears, wolves and foxes, with an occasional small deer. During spring and fall there are ducks in Oldman lake and some fish, consisting of pike, doré and goldeyes. There are no settlers in the township at present but quite a settlement four miles farther on in Pembina valley locally known as 'Wild Horse valley.' The preliminary survey line of the Grand Trunk Pacific enters this township in section 24, and leaves it in section 35.—*Thos. Fawcett, D.T.S., 1906.*

57. Access to this township is gained by means of a trail opened by the surveyors in charge of the Grand Trunk Pacific railway preliminary surveys, it enters the township in section 5, and leaves it in section 18, following closely the surveyed line of the railway across the southwest corner of the township. The trail when not frozen is in very bad condition. The soil generally is a clay loam except near Pembina river, where it is sandy and the subsoil usually clay. All the elements needed in a fertile soil seem to be present. The surface is rolling to hilly and the whole covered with timber or brush and on that account would scarcely be recommended for settlement. The greater portion would be worth preserving for a timber berth as there is much valuable spruce of considerable dimensions. Two-thirds of the township next the north boundary might be set aside for a timber berth (except sections 18 and 19). There are squatters in sections 6, 7 and 19. For two miles lying north of the south limit of the township, poplar is the predominant timber, with thick scrub and isolated patches of spruce and tamarack. Portions of the township, probably one-fourth of the entire area, have been overrun with fire four or five years ago and much of the timber destroyed. There is excellent spruce in the vicinity of Pembina river varying in size up to 36 inches in diameter, and cottonwood up to forty inches. I would estimate the merchantable spruce at 12,000,000 feet, board measure, besides other valuable timber. There is some hay in sloughs formed through changes in the river bed, but in no large quantities. Water is abundant and good in all parts of the township. The north end of the township is principally muskeg saturated with water to the surface of the ground and boggy everywhere the timber is large. There are no falls on the river or rapids worth noting although the current is strong during periods of high water. Climatic conditions seem favourable, there being no indications of summer frosts or injury therefrom. The wood supply for fuel is everywhere plentiful, but no indications of coal were seen except small fragments washed up by the stream along the banks of the river. No minerals of economic value were seen nor rock valuable as building stone. Game seemed scarce, consisting of small red-deer and occasional bears, foxes and wolves. The river seemed well stocked with fish, consisting of pike, doré and goldeyes.—*Thos. Fawcett, D.T.S., 1906.*

58. The means of access to this township is a trail cut from the Edmonton-Peace River trail some seven years ago by a Mr. Menier, who resides on section 33. The road is in fairly good condition during the dry season of the year. Both clay and sandy soil are found in most sections, with usually a clay subsoil suitable for growing either grain or root crops. The south half of the township is heavily wooded, while the north half is timbered with poplar and scrub or open scrub brûlé. The south half of the township, owing to the presence of several large muskegs or floating bogs, is scarcely suitable for settlement, but contains some good timber, spruce, tamarack, poplar, &c., and might be set apart for a timber berth. There would easily be over 100,000 feet board measure of merchantable timber on each section of 640 acres, or an estimate of 2,000,000 feet would not be too great for the south half of the township. There are a few hay sloughs scattered over the north half of the township, but

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Range 4—Continued.

none of large dimensions. The water is fresh and abundant in ponds and lakes. There are no streams except a few gulches which carry off surplus water in the spring and during periods of flood. Garden produce and grain are grown successfully, as seen on squatters' claims, with no more liability to summer frosts than elsewhere. Wood for fuel, dry poplar, spruce, tamarack, &c., is plentiful. No indications of coal nor minerals of any kind were seen nor any outcrop of rock. Game seemed to be scarce. Ducks settle in the ponds and lakes during spring and fall, but few seem to breed there. Wolves hover around the settlement. Rabbits are plentiful, and supply both wolves and foxes with food.—*Thos. Fawcett, D.T.S., 1906.*

59. Access to this township is open from the south by means of a trail which branches off from the trail crossing township 58, range 4, in section 36, also at the northeast corner of the township, where a branch from Peace river trail enters the township. Both roads are passably good in favourable weather. The soil is generally a sandy loam with subsoil of clay, and is well adapted for producing any kind of crops. The surface is undulating, with some considerable hills, and covered with timber or scrub. The greater part is *brulé* overgrown with brush. Nearly every section contains patches of green timber which escaped destruction when the fire ran over the country. These green patches are usually protected by muskegs which are numerous in all parts of the township. While there is plenty of good timber for all purposes of settlement and some very valuable spruce, yet not enough to justify withholding the land from settlement, as there are portions of every section that can be easily cleared of brush and ground timber and made ready for the plough. Considerable hay may be obtained from marsh meadows, especially after improvement. Water is easily obtainable in all parts and is of good quality. The choice locations, with water as a prime object, are on Paddle river which enters the township in section 6, and after following a winding course emerges in section 13. The stream, which averages a chain in width, is from three to ten feet deep and contains excellent water, and seems fairly well stocked with fish. There are no falls nor rapids worthy of note on this part of the stream. Climatic conditions seem favourable, with few indications of injury from frost. Garden produce was mostly green up to the middle of September. Wood for fuel abounds in large quantities all over the township. No indications of coal or other minerals of value were observed, nor did we see any outcrops of rock suitable for building purposes. Ducks are found in the lakes and ponds during spring and fall; partridges and chickens are present but scarce. Wolves seemed rather numerous, and foxes also make their home here. The greater part of this township is adapted for settlement.—*Thos. Fawcett, D.T.S., 1906.*

60. This township is reached by the Chalmers or Dawson trail which enters on section 25, and then running northwesterly leaves it by crossing the north boundary of section 34. It is fairly good in dry seasons, but in the spring and after the June rains it was hardly fit to travel. The soil is a coat of black loam averaging ten to twelve inches deep over a sandy clay subsoil eminently suitable for farming. The surface is rolling. The eastern half is covered with a new growth of poplar one to three inches in diameter, with bluffs of large size as well as groves of spruce around the edge of the sloughs. There is a sufficient quantity to supply the first wants of the settlers. The western half of the township, especially sections 18, 19, 28, 29, 30, 31, 32 and 33 are heavily timbered with a fine growth of large spruce. About two million feet of lumber could be cut in each of these sections besides seven or eight thousand cords of pulpwood. There is no stream going through this township sufficiently large to drive lumber. Hay sloughs are not numerous but a good quantity of hay could be cut around the lakes in the southwestern part. The water is good wherever found, but there are

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 4—Continued.

no large streams nor water-powers that I know of. The climate is the same as in Edmonton. I have seen no stone quarries nor minerals of any kind. There is sufficient timber on every section to supply fuel for the first wants of the settlers and in most sections to supply the wants for years to come if properly cared for. We have seen tracks of bears and deer. Rabbits are plentiful and lynx are trapped all over the township. Ducks were thick in the lakes, but partridge and chickens were scarce.—*Geo. P. Roy, D.L.S., 1906.*

Range 5.

50. This township is accessible by a good wagon trail from Edmonton via Mewassin. The township presents a very rough appearance owing to the high rough banks of Saskatchewan river valley which passes through it. Owing to this roughness and also to the fact that the black loam covering it ranges in depth only from three to five inches with a subsoil on the higher places of clay and in the valleys of sand, this township is not suitable for agricultural purposes. Moreover the scarcity of hay and the presence of muskegs in the northerly portion are other features which spoil it for the farmer. One commendable feature is the presence of good water though there are no water-powers; another is the beauty of the climate which closely resembles that of the Edmonton district. In the southwesterly portion of the township, spruce timber up to two feet in diameter, and of a second grade quality, is found, a goodly portion of which has been cut and was being cut at the time of the survey. Also throughout the township poplar trees abound which are and will be the chief supply of fuel, though there is a likelihood of coal being discovered in the near future. Regarding stone quarries and minerals of economic values there are none, and the game found is of no consequence.—*R. H. Knight, D.L.S., 1906.*

57. The best route for getting to this township is by means of the Grand Trunk Pacific wagon road which runs from Sion to McLeod river. This trail enters this township in section 13 and runs approximately due west, keeping south of Pembina river as far as the east boundary of section 18 where it crosses over a good ford, and thence keeps along the north bank of the river, finally leaving the township in section 18. The part of this trail south of the river is very hilly and not at all good. From this trail, at Logan's store in the northeast quarter of section 13, where there is a good crossing over Pembina river, a settler's trail runs north to Morris' farm in section 26, from where I cut a road running approximately due north. This road runs as far as the trail from Peavine prairie to Belvedere in the south of township 59, range 5. I also cut another road from Morris' farm in section 26, which runs westerly through sections 26, 27, 28, 29, 20, 19 and joins the Grand Trunk Pacific Railway trail, first described, in section 18. The soil in this township is not first-class, consisting generally of three to four inches of black loam over a hard clay subsoil and can mostly be rated as second class land, suitable for mixed farming. In sections 5, 6 and 7 there is some first class land and along Pembina river, the flats have a rich deep soil, averaging from six to twelve inches of black loam over a sandy loam subsoil, which is suitable for all kinds of crops. The surface is generally undulating in character, and is covered with poplar and spruce, averaging from four to eight inches in diameter. About one-half of this township has been burnt over and is covered with brulé, windfall and willow brush. There is very little timber in this township, but some large spruce, averaging from ten to twenty inches in diameter, is to be found along Pembina river, especially on the south side and in small bluffs all through the township. There are no large hay meadows, but small ones are scattered all through the township. All the water in this township is fresh, and the supply is sufficient and permanent, being furnished by Pembina river which averages two hundred and eighty feet in width, two feet in depth, and has a current of three miles an hour; by Coyote creek which averages twelve feet

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 5—Continued.

in width, one foot in depth and has a current of one mile an hour, and by a permanent lake in sections 34 and 35. No land is liable to be flooded. There is no natural water-power available, but Pembina river could be dammed so as to furnish power. The climate is similar to the Edmonton district. Wood for fuel is available on every section. No coal veins have yet been discovered, but there is considerable float coal in the bed of the river and possibly coal will be found in this neighbourhood. There is no stone or mineral. There is not much game, but there are fish in Pembina river, namely, pike, perch and goldeye.—*Reginald H. Cautley, D.L.S., 1906.*

58. There are two routes for reaching this township, viz.: by the wagon trail which runs from Belvedere to Peavine prairie, which is a good trail and runs through the north half of sections 34, 33, 32 and 31 of this township; and by the Grand Trunk Pacific wagon trail which runs to McLeod river and follows the south bank of Pembina river through township 57, range 5, from this trail at Logan's store where there is a good crossing over Pembina river, a wagon trail runs as far as Morris' farm in section 26, township 57, range 5 from which I cut a wagon trail, running practically due north, through sections 2, 11, 14, 23, 26 and 35 of this township to meet the trail first described, in section 1, township 59, range 5. From section 11 in township 58, at the northwest corner of a lake which the trail follows, I cut a short trail running due west, which follows the north boundary of sections 10 and 9 as far as the northeast corner of section 8. The soil in this township is not very good, consisting generally of two to three inches of black loam over a sandy clay subsoil, and would not make first class farming land, although all of it is suitable for mixed farming. The surface is generally undulating in character and is covered with poplar four to eight inches in diameter with some spruce and tamarack four to eight inches in diameter in swampy places. Nearly one-third of this township has been burnt over by bush fires and is covered with *brulé* and windfall with poplar and willow underbrush. Along Paddle river there is usually a strip averaging a half mile in width of marshy flat, covered with gray willow and willow brush. There is very little valuable timber in this township, although there are occasional large spruce scattered through it. There are several small hay meadows along Paddle river, but none of any size. In the south half of section 25 along a small creek valley, probably fifty or sixty tons of hay could be cut, and there are occasional small hay meadows scattered all through this township. All the water in this township is fresh, and the supply is sufficient and permanent, being furnished by Paddle river, which averages thirty feet in width, two feet in depth and has a current of two miles an hour, and which flows through sections 35, 34, 27, 28, 29, 30 and 31. The water is also supplied by eleven permanent lakes. The banks of Paddle river are very steep cut and average fifteen feet in height and no land is liable to be flooded. No water-power can be developed. The climate is similar to that in the Edmonton district. Wood for fuel can be obtained on every section, but no coal or lignite has been found. There is no stone or mineral and no game.—*Reginald H. Cautley, D.L.S., 1906.*

59. The trail from Belvedere to Peavine prairie, which is a good trail, passes through sections 1 and 2 of this township and then runs approximately due west, keeping about one-quarter of a mile south of the correction line. From this main trail, in the northwest quarter of section 1 there are two other trails branching off; one running approximately north and keeping near the east boundary of the township; and the other running in a northwesterly direction along a creek valley as far as the central meridian which it continues to follow very closely. Both these trails were cut by myself, and run into township 60. The soil in the east half of this township is good, consisting of eight or nine inches of black loam over a clay subsoil and is suitable for raising all kinds of crops; but in the west half the soil is very light, consisting of three inches of black loam over a sandy clay subsoil, and is very stony in

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 5—Continued.

places. It would not be suitable for raising crops, but would make a fairly good range country. The surface in the east half of the township is undulating in character, but in the west half it is broken or steeply rolling in character. The whole township was evidently at one time timbered with very heavy spruce, but this has nearly all been destroyed by fire. Now there is windfall overgrown with poplar and willow brush over nearly all the township, but bluffs of spruce and poplar are to be found scattered all over the township. There is not much timber in this township, but small bluffs of spruce averaging from six to eighteen inches in diameter are scattered all over it. There is not much hay in this township, but probably one hundred tons or more could be cut along the big creek which flows through the centre of this township. All the water is fresh and the supply is sufficient and permanent and is furnished by two fairly large streams and six permanent lakes. The two streams are as follows, viz.: Paddle river, which flows through sections 12, 1 and 2, and is forty feet wide, two feet deep and has a current of two miles an hour; a large creek which flows south, through the centre of this township, into Paddle river and averages fifteen feet wide, eighteen inches deep and has a current of one mile an hour. The lakes are situated as follows: in sections 36 and 35; Swan lake in sections 19, 20, 29 and 30; in sections 15 and 16; in sections 17 and 18; in section 7 and in sections 3 and 4. Of these, Swan lake is a very fine lake with deep water and sandy shores and contains jackfish, but the others are shallow lakes with marshy edges. There is no water-power available. The climate is similar to that of the Edmonton district. Wood for fuel is available on every section, but no coal or lignite has been found. There is no stone suitable for quarrying and no minerals have been discovered. There is no game.—*Reginald H. Cautley, D.L.S., 1906.*

60. There are no good trails through this township, the only ones being those cut by myself. There are two ways in which this township can be reached from Belvedere on Pembina river. Firstly, by means of the Klondike (or Swan Hills) trail, from which I cut a wagon road approximately due south to the northeast corner of the township, whence it continues approximately due south; secondly, by means of the Grand Trunk Pacific wagon road to Peavine prairie, which crosses the southeast corner of township 59, range 5; in about the middle of the northeast quarter of section 1, township 59, range 5, there are two trails branching off this main trail, one running due north (approx.) being the continuation of the trail first described, and the other running in a northwesterly direction along a creek valley until it reaches the central meridian of township 59, along which it runs almost due north, although keeping to the west of the meridian after once crossing it; this trail runs as far as the middle of the northeast quarter of section 16, township 60, range 5, but is not as good a trail as the one keeping to the east boundary of range 5. The soil is good as a rule, being composed of four or five inches of black loam over a sandy loam or sandy clay subsoil, and if the land is cleared should prove suitable for all sorts of mixed farming. The surface is very broken in the centre of the township, but as a rule is gently rolling in character and for the most part is heavily timbered with spruce averaging from eight to twenty-four inches in diameter with some poplar, cottonwood, tamarack and birch averaging from six to eighteen inches in diameter. There is a great deal of muskeg and swamp in this township, especially in the northern part, covered with spruce and tamarack averaging from three to eight inches in diameter and there is also considerable land in the north and south parts of the township covered with *brulé* and windfall overgrown with small poplar. There is good spruce timber averaging from eight to twenty-four inches in diameter with some poplar, cottonwood, tamarack and birch timber averaging from six to eighteen inches in diameter to be found in nearly every section in this township, although in the extreme north and south portions it has mostly been destroyed by fire. There is very little hay in

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 5—Continued.

this township, the only place in which some was found being on the edge of the two lakes on the east boundary of section 14, where in dry seasons about one hundred tons could be made. All the water in this township is fresh and the supply is sufficient and permanent, being furnished by several small creeks and seven permanent lakes. One of the creeks flows through sections 6 and 5, and is twelve feet wide, one foot deep, and has a current of two miles an hour. The lakes are situated as follows: in sections 34 and 35; in sections 22, 27 and 28; in sections 14, 15, 22 and 23; in sections 13 and 14; in sections 1 and 12, and in sections 1 and 2. No land is liable to be flooded. No water-power can be developed. The climate is similar to the Edmonton district, but more liable to summer frosts owing to the presence of large muskegs. Wood for fuel is procurable on every section. There are no stone quarries, minerals or coal veins. There are some moose and deer.—*Reginald H. Cautley, D.L.S., 1906.*

Range 6.

8. *Sections 1 and 2.*—A narrow timbered valley runs southeasterly through section 1, the timber being mostly jackpine and spruce up to eight inches in diameter. A good creek runs northerly through this valley. The east half of section 2 is broken by a mountain which is covered with spruce timber. A good wagon road leading into Crowsnest passes through section 1. The fuel is wood and can be procured on those sections. No hay occurs on these sections nor any water-powers. No game and no traces of minerals were found. The soil is a sandy clay in the valley, and mostly bare rocks on the side-hills. The climate is very changeable and summer frosts occur. Plenty of limestone rock can be quarried on these sections.—*Lennox T. Bray, D.L.S., 1906.*

50. *Portion south of Saskatchewan river.*—This portion of the township can be reached by a trail recently constructed by lumbermen, which enters the township along the south side of Saskatchewan river. This trail crosses the river about fifteen miles eastward. There is a good trail on the north side of the river which is an extension of the Mewassin trail from Edmonton. The portion of land included in this report is exceedingly rough and broken and is quite unsuited for agricultural purposes. The whole is covered by bush which varies in size up to two feet in diameter, with a scrub undergrowth in all parts of the township. The large timber is chiefly spruce, of a second grade quality. A considerable quantity of this had been cut and what remained was being cut at the time of survey. There is no hay to be seen, but a sufficient supply of good water is to be had. There are many ravines to be found adjacent to Saskatchewan river, all of which contain small streams of good water. There are no water-powers on the above mentioned river, but along its banks can be seen good sandstone. None of this stone has yet been quarried except on a small scale for testing purposes. The stone is good and can be transported down stream very cheaply to the towns and cities located along or near the said river. The climate in this vicinity is good, being about the same as that of the Edmonton district. Frosts did not occur during the time of survey. Minerals of economic value are not apparent, neither is there any game worth mentioning.—*R. H. Knight, D.L.S., 1906.*

50. To reach the work was an easy matter, as a wagon road runs from Edmonton, some seventy-five miles west. The surface of the ground in this township is fairly level until nearing the river, where it is rolling, and contains a fair amount of non-merchantable timber, consisting mostly of scattered poplar—a heavy underbrush of scrub poplar and willow—and a narrow fringe of spruce along the river. The soil would be most suitable for mixed farming, being a clay subsoil with about four inches of good black loam. Hay is very scarce, although good grazing is to be had during

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 6—Continued.

the summer. No lakes occur, but water is reached at a short depth; sloughs were shallow and dry. Big creek, in the northwest corner of the township, is the only stream of any importance. It is some twenty-five feet in width and about five feet in depth at high water. It is so tortuous and uncertain in supply that it could not be looked upon as being of any use commercially, for water-power, log driving, &c. The climate as indicated by the growth is good and frost during the summer is only occasionally experienced. Fuel is abundant in the shape of firewood, and the likelihood of coal is shown by the quantity of float in Big creek along which are posts driven and marked 'Coal Claims.' No seams were seen, but it is generally known that there is an abundance of coal in the locality. Along the river running through this township large outcroppings of sandstone were to be seen in several places, some of which are about to be developed. There are no minerals. Game of all kinds is to be had, from moose to prairie chickens.—*A Driscoll, D.L.S., 1906.*

51. *Southern part.*—This township is easily reached by a good trail from Edmonton via Mewassin. The portion of land herein reported upon is quite level, but yet is of little value in the near future for agricultural purposes, on account of the numerous swamps and muskegs. These swamps and muskegs are generally covered with small spruce timber up to six inches in diameter, which is frequently dead. The higher and drier portions of land have upon them a growth of poplar up to six inches in diameter, with an undergrowth of willow scrub. Hay is scarce, so also is good water, though there is plenty of surface water of a poor quality obtainable from the swamps. The only fuel consists of the wood mentioned above, but undoubtedly there is at a moderate depth large coal areas which are common to the surrounding country. There are no stone quarries, neither are there apparent any minerals of economic values. There are no water-powers. The game in this portion of the country is of no consequence.—*R. H. Knight, D.L.S., 1906.*

55. The township is crossed by the road from Lac Ste. Anne to Paddle river. I have not travelled over the road, but I hear that it is hardly in good enough condition to allow wagons to go over it. The soil consists generally of black loam with a subsoil of clay or sandy clay. Stones are found only in a few pits. The soil is very good for farming. Almost all the quarter sections would rate either as class No. 1 or 2. The township is covered with poplar and willow. There are a few open spots in the eastern part. Spruce is scarce. There is no timber of consequence in the township. Jackpine is found only in a couple of spots. Spruce is found in several places, but only in small quantity, and always mixed with poplar. Most of it is less than 9 inches in diameter. As the township is timbered there are but few spots where hay is found. On sections 9 and 21 some hay could be made, though not many tons. The water is not alkaline. In some lakes (Prefontaine and No. 2) it is not fit to drink. There is no stream of importance. The biggest creek comes from the southeast and empties into lake No. 2. No water-power is available. The climate is something like that of Edmonton, I presume. The coldest recorded was 49° below zero, on January 26th, 1906. The fuel most readily available is dry wood. It is quite plentiful. There are no coal veins known to me. There are no stone quarries or minerals. Deer and bear would probably be found in the township.—*Raoul Rinfret, D.L.S., 1905.*

56. The township is crossed by the road from Lac Ste. Anne to Paddle river. I understand that it is hardly in good enough condition to allow of wagons to travel over it. The soil is very good for agriculture. Three-fourths of the sections would rate as class No. 1. Gravel and stones are met with occasionally in the pits. The soil consists of black loam with a subsoil of clay or sandy clay. The township is well covered with timber which consists of big poplar and willow. There is birch

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 6—Continued.

scattered here and there. Spruce is scarce in the township. Some is seen along Deep creek in some spots, and in the southeast corner of the township. There is very little hay to be made. The only place where hay is found is between lakes Kelly and Hope, and in small quantity. The water of lake No. 1 is not fit to drink. The only creek of importance is Deep creek, which is the outlet of lake No. 1. There is another creek running northerly in the northeastern part of the township. Deep creek, on the east boundary of section 25, township 56, range 7, is 25 links wide. It was dry in January. The climate would probably be like that of Edmonton. The coldest recorded by me was 49° below zero. Dry wood is very readily available. There are no stone quarries or minerals. Deer and bear would probably be found. The township is fairly level, except the western part. The Grand Trunk Pacific is expected to pass a few miles north of this township.—*Raoul Rinfret, D.L.S., 1905.*

57. This township can be reached by the road running to McLeod river, which crosses range 6 approximately along the correction line, and by going from there southward across township 58 by our road. It can also be reached by the south branch of the McLeod road, which runs along Pembina river, but this road across range 5 is practically impassable. The soil as a whole is good, especially along Pembina river, where it is black loam top soil and sandy loam subsoil. On the high ground there is a clay subsoil. It is suitable for raising grain and vegetables, and some of the new settlers obtained good crops of both this season. The surface is level as a whole, though there are various well-defined valleys, but the change is not abrupt except in places along Pembina river. The surface is completely wooded. Originally the timber was spruce of large size, but this has been burnt to some extent, and it is now mainly covered with poplar three to twelve inches in diameter. The original timber shows either as standing dead timber, or as thick deadfall, and making a road through it entailed a great deal of work. South of Pembina river the timber is spruce, poplar and tamarack, most of which is of small size, and it is principally green. There are a few meadows along Pembina river and also on the high land, but hay is scarce. The water is fresh and wholesome. There are various small ponds and minor creeks, but the latter dry up in the fall, and at that season it was difficult to find water. Pembina river is the permanent stream. It is about four chains in width and from three to twelve feet in depth, depending upon the season, and it has a current of about three miles an hour. It runs in a well-defined valley, and I judge that the adjacent land is not flooded, or if so, it is only temporarily from ice jams. No water-powers exist, but they could possibly be developed along this river. The climate is favourable, and no summer frosts were observed. Timber fuel is plentiful, but no coal was discerned, nor were other economic minerals observed. Ducks, rabbits and grouse are plentiful, and the fishing in Pembina river is good.—*Thos. Drummond, D.L.S. 1906.*

58. The best route for reaching this township is by a road leading to McLeod river which crosses range 6 approximately along the correction line, and thence southward by a road cut by my party. The soil consists of the usual covering of black loam, and the subsoil is usually clay, except when it is a sand or sandy clay, which is presumably underlaid by the clay. The township is covered with timber, which is somewhat small and scrubby. As a whole it is poplar, but spruce occurs in clumps, and is scattered through the poplar. There is also quite a lot of meadow land covered with thick willow. Several good hay meadows were found in this township, notably around Twin lakes and in sections 15 and 16, and along Paddle river and the various creeks. This is practically all overgrown with willow, but by clearing, a large area of good meadow land could be obtained. A peculiarity of this land is its hummocky nature, which is probably due to the action of frost and heat in forming cracks in the clay soil. The grass is locally known as blue joint and it is of good quality. It

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 5—Continued.

might be added that cattle do well in this country, but it is apparently not so favourable for horses. This township is suitable for ranching. There is an abundance of good water throughout the township. There are quite a number of large lakes and several large streams of a permanent character. Paddle river is the principal branch of Pembina river. It traverses the township in a northeasterly direction, is about sixty feet in width and from two to twelve feet in depth, and has a current of about three and one-half miles an hour. Southeast of this stream and about one-half mile distant from it is a parallel stream which I consider runs in an old bed of Paddle river. It is about seventy feet in width, from five to ten feet in depth, and has very little current. A creek joins Paddle river from the north side in section 15; it is about twenty feet in width and from three to five feet in depth and has a current of about two and one-half miles an hour. One branch of it runs through Chip lakes, and the south branch runs eastward from the adjoining township. Along all of these streams the adjoining meadow land is flat and low, and it is probably flooded more or less in the spring freshet, but to what extent and depth I cannot state. Wood fuel is plentiful everywhere, but coal was not discovered, nor were other economic minerals observed. Ducks, geese, grouse and rabbits are plentiful, and there are pike and other fish in the streams, and in several of the lakes.—*Thos. Drummond, D.T.S., 1906.*

59. The route to reach this township is by a road going to McLeod river. It is in bad condition, as it crosses various muskegs and streams. To make it passable I had to corduroy several muskegs, and build various bridges, one of which crosses Paddle river, and has a span of about sixty feet. This road crosses range 6, approximately along the correction line, and our own road runs northward from it across the township. The soil is very good, and it is suitable, I should judge, for raising the various grains and vegetables. It consists of black loam top soil and a clay subsoil. This clay land, I judge, would make good wheat land, as there is a rank growth of peavine in the poplar land. The surface is covered with timber, spruce, tamarack, birch and willow. One portion, i.e., the greater part of sections 16, 17, 18, 19, 20, 21, 28, 29 and 30, is included in timber berth No. 1191, and consists of spruce of large size and good quality. Most of the remaining part of the township is covered with poplar, three to ten inches in diameter. The surface is rolling, and in many places quite rough and hilly. Swamp hay of good quality, and in considerable quantity can be obtained along the shores of Thunder lake and Twin lakes, and also along a creek which runs in a southeasterly direction, across the southwestern part of the township. The water is quite fresh and wholesome. There are many lakes, some of which are of considerable size, in which the supply is permanent, and there are also various creeks, which are not as permanent in the fall of the year. Some of the meadow land along the creeks is probably flooded for a short time in the spring, to a depth of perhaps one foot. No water-power exists, and none could be developed. The climate seems favourable, and no summer frosts were observed. Wood fuel is plentiful everywhere, but no coal or other economic minerals were discovered. The various waterfowl are plentiful, also rabbits, and some of the fur-bearing animals, and in the fall of the year Indians killed three moose in the township.—*Thos. Drummond, D.T.S., 1906.*

60. The best route to this township is by a branch of the road leading to McLeod river, which approximately follows the correction line across range 6, and thence northward by a road cut by my party. The soil is good. It consists of the usual covering of black loam, with a subsoil of sandy clay, underlaid at a greater depth, presumably, by the usual clay subsoil of the country. The timber is heavy, however, and there are quite a number of muskegs. The soil is suitable for growing the various grains and vegetables. The surface is fairly level as a whole, except along the northern part of the township, where it becomes somewhat rugged and rough, as it rises to the height of land, between Athabaska and Paddle rivers. Timber con-

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 6—Continued.

sisting of spruce, tamarack and poplar, is found all over the township. The spruce is of large size; many trees two to three feet in diameter were cut, and it is of good quality, straight and clear of branches. Timber berth 1191, a survey of which has been made by the owners, includes a large portion of this township. In the remainder of the township the timber has been destroyed by fire, and it is now more or less overgrown with poplar. Hay is very scarce throughout the township. A little can be obtained along a creek which traverses the southern part of the township. Apart from this we could find none, not even feed for our horses. The township is fairly well supplied with fresh water by various lakes of considerable size, and by several streams. The lakes are permanent, but the creeks practically dwindle to nothing in the fall and winter. There are no water-powers and none could be developed. The climate seems favourable, and no summer frosts were observed. Timber fuel is plentiful and can be procured everywhere, but no coal was discovered. No minerals of economic value were found. Moose and bear seem plentiful, and the same remarks apply to geese, ducks, rabbits and grouse, and the various fur-bearing animals.—*Thos. Drummond, D.T.S., 1906.*

Range 7.

56. This township is covered with a heavy growth of timber, consisting of poplar five inches to twelve inches in diameter and spruce four inches to fifteen inches in diameter, except parts of sections 31, 32, 33, 34, 35, 36, 28 and 27, over which the fire has run, leaving only a few bluffs of green poplar, with a new growth of small poplar and willow brush. These are good farming sections. The balance of the township is too thickly wooded for immediate settlement. A pretty good wagon trail from Lake St. Anne to Paddle river crosses sections 31, 32, 33, 34, 26 and 25. Pembina river flowing north crosses sections 4, 9, 16, 15, 22, 27, 23, 26, 35 and 36. This township is well watered by numerous creeks. The land is about level on the west side of the Pembina and rolling on the east side. It is a good second class land. There is good fish in the river, but I did not see any game in the township. There are good seams of coal all along the Pembina, which is also running a little gold.—*A. Michaud, D.L.S., 1905.*

57. *East and north outlines.*—Pembina river is crossed in section 1, along which there are small areas of prairie to the west. Sections 1, 12, 13, and the south half of section 24, are densely timbered with poplar from four to eight inches in diameter. The height of land between Pembina and Paddle rivers is about the centre of the north half of section 12. From there the land slopes gradually to the northwest. The bottom lands are reached about the middle of section 24; from here to the northeast corner of section 36 the land is low and wet with willow scrub and grass sloughs. Paddle river, a stream about thirty-five links wide, three feet deep, with slow current and mud banks from six to eight feet high, flows in a northeasterly direction crossing the east outline about the middle of section 25. The north outline is mostly on the south slope of a range of hills separating Paddle river from another stream flowing across township 58. The north boundary of section 36 is swampy, with willow scrub and sloughs. The east half of section 35 is covered with green poplar, from three to six inches in diameter; the remainder of the outline is rolling and runs through old brulé grown up with poplar and willow scrub. An old pack trail is crossed at the northwest corner of section 33. The soil is six inches of loam over clay, with some stones in places. No coal or lignite veins were found. No stone quarries and no minerals of economic value were observed. The game was bear, rabbits, ducks and a few partridge.—*Hugh McGrandle, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 7—Continued.

58. This township is reached from Edmonton via Lac Ste. Anne, by a trail which enters the township at the southeast corner of section 5, and which is in very bad condition and almost impassable for wagons in wet weather. I cut a new trail around a number of swamps. Another trail via Belvedere post office crosses the north end of the township. This trail is also in bad condition, following hay sloughs, along creeks, and around small lakes. The soil in this township is mostly a clay loam over clay, but on the top of some of the ridges there is sand and gravel with some large stones; it is suitable for mixed farming. The surface is rolling to hilly, and is covered with a second growth of poplar and willow scrub, and is dotted over with small swamps of spruce and tamarack from six to ten inches in diameter. There is one or more of these swamps on almost every section. The southwest half of the township has no standing timber, except in the small swamps mentioned above, and a few small clumps of poplar on the south half of section 6. The northeast half of the township is dotted over with clumps of dead poplar and spruce. Along the east boundary is a considerable quantity of standing dead spruce from eight to ten inches in diameter. The greater part of section 1 is covered with green poplar from four to six inches in diameter, with some spruce from six to eight inches in diameter, and on the northeast quarter of section 31 is some large green spruce, poplar and cottonwood from ten to twenty-four inches in diameter. The whole surface of this township is covered with fallen timber, with the exception of patches where the timber has been nearly burned up. This is the case on portions of sections 7, 8, 17, 18, 20, 21 and 14. The standing timber, with the exception of that on the northwest quarter of section 31, is fit only for settlers' use. A creek from fifteen to twenty links wide, and from one to two feet deep, meanders through the centre of the township, from west to east. The north branch enters the northwest quarter of section 30, and the south branch enters the southwest quarter of section 18; the two branches join in the southeast quarter of section 30, and flow in an easterly direction through sections 29, 20, the southwest corner of 28, 21, 22, the southwest corner of 23, 14 and 13, leaving the township at the southeast quarter of section 13. The only hay seen in the township is on the southeast quarter of section 1, and along the valley of the above mentioned creek, where a considerable quantity of coarse slough hay could be put up. On the high land is a luxuriant growth of wild vetches which is excellent feed for stock until the snow falls. The water is slightly alkaline, but I think, sufficient and permanent. The above mentioned creek is supplied from springs, and there are several small ponds throughout the townships. There are no water-powers. The climate is fair; rather wet this summer, with light summer frosts, but not severe enough to harm early crops. Good potatoes were grown in the township this season. Wood for fuel is available on almost every section. There are no stone quarries. No minerals of economic value were found. Very little game of any kind was seen, except rabbits and ducks in season.—*Hugh McGrandle, D.L.S., 1906.*

59. *Part subdivision.*—This township is reached by the wagon trail from Edmonton, via McDonald's crossing on Pembina river. This trail crosses the north end of township 58, range 7, west of the fifth meridian, and is rough and in bad condition and almost impassable in wet weather, as it follows a chain of sloughs along creeks and small lakes. The soil is about six inches of sandy loam and stone over clay, suitable for grazing after the timber is removed. The surface is gently rolling and covered with heavy timber, consisting of spruce and cottonwood from ten to thirty inches in diameter, also some white birch. On the south half of section 31, and extending into 30, is an old brûlé and windfall grown up with poplar and willow scrub. Sections 1, 2, 3 and 12 have been burned over lately, and there is now only small patches of green timber left on these sections. The township is watered by several small streams of good water, but the supply would not be sufficient and permanent in dry seasons.

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 7—Continued.

There are no water-powers. No minerals of economic value were seen. The game consists of moose, bear, rabbits and partridges. I would recommend this township for a timber berth, with the exception of the sections named above; in fact it was surveyed for a timber berth a year or so ago.—*Hugh McGrandle, D.L.S., 1906.*

Range 8.

58. *East outline.*—This township is reached by a wagon trail from Edmonton via Belvedere, entering the township near the northeast corner of section 25. This trail is rough and in bad condition, and would be almost impassable in wet weather. There is also an old pack trail (along which I took wagons) branching from the Lac Ste. Anne and McLeod river trail at Paddle river crossing and entering this township in section 13. The soil is a light clay loam from eight to twelve inches over clay, suitable for mixed farming. The surface is rolling and covered with small poplar and willow scrub, and a few small swamps of spruce and tamarack. The scrub and timber in this township is mostly all fire-killed, and another fire or two would convert a good portion of it into prairie, especially sections 12 and 13 and westward which is now called Peavine prairie. There is no timber of any value in the township except on section 36 which is covered with green spruce, poplar and cottonwood from ten to twenty-four inches in diameter. I saw no hay lands, but the surface is covered with a luxuriant growth of wild vetches. The northern portion is well watered by springs or small creeks of good water. There are no water-powers. For fuel there is a good supply of poplar and spruce in the northern portion of the township, and some small bluffs scattered over it. No stone quarries and no minerals of economic value were found. The game is bear, rabbit, sandhill crane and a few partridge.—*Hugh McGrandle, D.L.S., 1906.*

59. *East outline.*—This township is reached from the wagon trail crossing the north portion of township 58, range 7. The soil is a sandy loam over clay and stones, and is rated fourth class, with the exception of section 1 which is rated third class. The surface is rolling and covered with heavy timber consisting of spruce and cottonwood from ten to twenty-four inches in diameter, and poplar, balsam and birch from six to ten inches in diameter. There is no hay. Water is scarce. A few small creeks run through the township, but they are dry in a dry season. There are no water-powers. Wood is plentiful for fuel, but no coal or lignite was seen. No stone quarries and no minerals of economic value were seen. The game consists of moose, bear and rabbits.—*Hugh McGrandle, D.L.S., 1906.*

60. *East outline.*—This township is reached by pack trail along or near its outlines, from the wagon trail crossing the north end of township 58. An old pack trail crosses the east boundary of section 13, and appears to run parallel to Athabaska river which crosses the line at the northeast corner of section 25, and flows in a northeasterly direction through section 31, range 7. The soil is a sandy loam over stony clay, would rate fourth class, and is only valuable for its timber, or for grazing after the timber is removed. The surface is rolling, and very broken near the river, and is covered with heavy timber from ten to thirty inches in diameter, consisting of spruce, cottonwood and poplar. There is no hay. The township is well watered by small streams and ponds and Athabaska river. There are no water-powers. There is plenty of wood for fuel, but no coal or lignite was found. No stone quarries and no minerals of economic value were observed. The game consists of moose, bear, deer, rabbits and ducks, and fish in the small lake on section 1.—*Hugh McGrandle, D.L.S., 1906.*

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 11.

26. *Western part.*—A trail runs from Banff to lake Minnewanka traversing this area. This trail is always in good condition. The soil is rocky and gravelly, suitable only for grazing. The surface is covered for the most part with brulé and a thick growth of small jackpine. On sections 30 and 31 there is a considerable quantity of spruce as large as eighteen inches in diameter. This occurs in small bunches throughout both sections. There is no hay. The water is all fresh with a permanent and sufficient supply. Cascade creek will average in low water one-half chain wide, one foot deep and a velocity of six feet per second. There is no danger of floods. Water-powers could be developed on Cascade river, but it would require a long high dam with great danger of washouts. Summer frosts were observed every month during the summer. The climate is changeable but owing to the elevation very healthy. Both wood and coal are abundant in the township. Bankhead town and mine, belonging to the Pacific Coal company, are situated on section 19. Limestone boulders and ledges are found all over the district. None is quarried, however. Coal is the only mineral found. Mule deer, coyotes, mountain lion and bear are found in this township. No birds were seen, such as ducks or geese. The sections are underlaid with coal which is being mined by the Pacific Coal company. The coal mined is a rather inferior anthracite but gives very good satisfaction for domestic purposes. The coal company have extensive shafts, tipples, &c., and are especially well equipped with compressed air locomotives for speedy handling of cars, &c.—*C. C. Fairchild, D.L.S., 1906.*

27. *Sections 6 and 7.*—These sections are traversed by the Cascade river pack trail and are only accessible by pack or saddle-horse at present. There is little or no soil in the township. These sections are generally covered with spruce and jackpine averaging eight inches in diameter north of Cascade river and west of the Cascade trail, and with brulé and small jackpine on the balance of the township. There is no hay. There is an abundance of fresh water in Cascade river and numerous springs and creeks flowing into it. There is no suitable water-power owing to the shallow nature of the river and danger from anchor ice. Summer frosts are frequent. The climate is healthy. Coal and wood may both be procured on the sections. There are no stone quarries. Coal is the only mineral found. Deer and sheep were seen, also coyotes and mountain lions.—*C. C. Fairchild, D.L.S., 1906.*

Range 12.

26. *Part.*—This work lies contiguous to the Banff-Lake Minnewanka trail on the east side of Cascade mountain. To get into the sections on the west side of Cascade it is necessary to go in either over Stony Squaw mountain to Fortymile creek and thence along an old hunting trail up the valley between Cascade and Sawback mountains, or to go up the Cascade river trail to near the north boundary of township 27, range 12, and thence up a canyon between the two northerly peaks of Cascade mountain into the same valley between Cascade and Sawback mountains. I cut this trail out sufficiently to get through but expect fallen timber will soon fill it in again. This trail is on an average of one and a half miles from any of the lines surveyed in township 26, range 12, and these lines can only be reached on foot after a stiff climb. The portion of this township subdivided consists of the main part of Cascade mountain, and many of the section lines are wholly or in part inaccessible. There is little or no soil in the township, nearly all the surface being rock. The east side of the mountain, up to an elevation of 6,500 feet, is covered with spruce and jackpine averaging one foot in diameter, interspersed with brulé and thick small jackpine. There is no hay. There is plenty of good fresh water in the numerous springs and small creeks which run down the sides of the mountain, disappearing and reappearing at irregular intervals. There is no danger of floods except from snowslides. There are many miniature falls, some

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 12—Continued.

five or six hundred feet high, and the streams are all rapids and falls, but the volume is not sufficient for power purposes. The climate is healthy and bracing and frosts were observed every month, and when in high places on the mountains every day of summer. There is plenty of both coal and wood on the mountain. The Pacific Coal company's tunnel, I believe, runs under the mountain into this township. There are no stone quarries at present. Coal was the only mineral found. It outcrops along the small creeks in various places on the east face of the mountain, which has all been prospected. Mountain sheep are quite plentiful on Cascade mountain, and a few mule deer were seen, also two bear (grizzly), one mountain lion, numerous coyotes, but no mountain goat were observed. A few ptarmigan and rabbits were also seen.—*C. C. Fairchild, D.L.S., 1906.*

27. This township is reached by a pack trail known as the Cascade trail from Banff. This is a fair trail for a mountain trail. What little soil there is along Cascade river is suitable for grazing. The surface is generally timbered in the southeast part. The balance of the river valley is covered with burnt timber in a good state of preservation. The timber is all of spruce or jackpine and averages eighteen inches in diameter for the most part. There is no hay. There is plenty of fresh water obtainable in Cascade river and its numerous small branches. Cascade river averages one chain wide, two feet deep with a velocity of five feet per second. There is little danger of flooding. Considerable horsepower could be developed by the construction of dams, but anchor ice and liabilities of flooding due to snow slides, etc., would make the economic value of the water-powers doubtful. Frosts were observed every month, but the air is bracing and the climate healthy. There is plenty of both wood and coal in the township. The coal outcrops in fourteen different points on one stream in sections 1 and 12. These are exposed by prospecting work and seem a part of the same seams as are being mined at Bankhead. There are no stone quarries in the township. There are no minerals besides coal as far as I know in the township. Sheep, deer, bear, coyotes, mountain lion, porcupine, rabbits, marten, mink, partridge and ptarmigan were seen in this township.—*C. C. Fairchild, D.L.S., 1906.*

28. *Sections 3, 4, 9, and 10.*—These sections are reached by the Cascade river pack trail from Banff, which is a very good mountain trail. There is little soil in the township, that being clay loam and suitable only for grazing. The surface is generally covered with heavy brulé or dry standing spruce and pine averaging eighteen inches in diameter. This size is reduced as you ascend the mountains and entirely disappears on the tops. There is no hay. There is plenty of good fresh water in Cascade river and small tributary streams. The river averages one chain wide, one foot deep with a velocity of five feet per second. Water-power could not be economically developed owing to anchor ice. None of the land is liable to be flooded. The climate is good. Summer frosts were observed every month. Wood is plentiful on these sections. No coal veins were seen. There are no stone quarries. There are no economic minerals as far as I know. Bear, deer and sheep were seen in the township.—*C. C. Fairchild, D.L.S., 1906.*

Range 14.

76. The south third of this township is at present heavily timbered with poplar and spruce from four to sixteen inches in diameter, and the land is high and quite rolling. Where it adjoins Buffalo bay, an arm of Lesser Slave lake, it falls in terraces about a hundred feet to the beach near the shore. The Salt Prairie Settlement survey covers a large part of the prairie in this township, but outside of it there are sections 36, 35, 25, 26, 22, 23 and 24 and that part of the township north of the settlement sur-

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 14—Continued.

vey which have prairie spots and light timber and windfall easily cleared. The centre portion of the subdivision rises towards the south and east to the rolling heavily timbered land. There is a large spruce swamp on sections 18, 19 and 20, which the fire ran through this summer, uprooting and falling the timber in many places, and there are other smaller muskegs on sections 22, 23 and 26. The several branches of Salt creek become one in section 27, and it flows with a current of about two miles per hour and has a depth of from four to six inches and a width of twenty feet. It runs through a valley seventy-five feet deep and from five to fifteen chains wide to section 21, where it leaves the valley and is within its own banks, often overflowing them, until it reaches Buffalo bay near the southwest corner of section 18. There are three good wooden bridges over it, one in section 18, one in section 17 and another in section 21, all built by private means. The soil, which is black and sandy loam on clay with some sand and sandy loam, is generally good, and grass grows luxuriantly. There was only one squatter living in this township at the time of the survey, but improvements have been made on the northeast quarter of section 34, there being a house, a stable and five acres of breaking; also on the northwest quarter of section 17, on which a good log house is erected, besides a stable and some breaking. The meridian between sections 20 and 21 ran through the improvements made by the only squatter living on his claim, on which he had a house, stable and several acres of breaking. Where crops are growing this season they look so well I think it will not be long before there are numbers of settlers here, in fact before leaving the district several had taken up their residence. Timber, except on sections 13, 14, 15, 16 and 17 and the south third of the township, is of very little value except for fuel. Some good spruce and poplar for building purposes may be got on these sections. Water in Salt creek is good for general use, but I am told that where wells are sunk there is quite a strong mineral and in some cases saline taste. No rocks or stones were seen except a few rolling stones in some sections. The wagon road from Lesser Slave lake to Whitefish lake runs partly in the settlement survey and partly in the township, and since the survey was made I have driven over a road lately cut with the aid of government money north from the village through sections 5, 8, 16 and 21 and crossing Salt creek at the bridge on section 21. This road being on high land is intended to be used when the freshets flood the one usually travelled around the shores of Buffalo bay.—*Henry W. Selby, D.L.S., 1906.*

77. *South part.*—This township is composed of high rolling country of varying character, but the portion subdivided is nearly all good for farming purposes. The north one-third is at present not suitable for farming, the west portion being largely a spruce muskeg and the easterly portion very rolling with some sand hills covered with a growth of timber of little or no value. Sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14 and 23 are composed of good prairie land, the southeast part containing bluffs of small timber, poplar and willow. Good water can be had on nearly all of these sections. They are suitable for mixed farming and stock-raising. Grass grows quite luxuriantly and it is quite frequently made into hay by those living near by. The soil is four to twelve inches of black loam or clay. There are no settlers in this township, but some breaking has been done and a fence built on section 2 and section 3. Both of these are sure to make good farms. The remainder of the township is covered with poplar bush and scattered spruce with willow brush along the creeks and sloughs. Two branches of Salt creek pass through these lands, but there is very little saline taste to the water. The wagon road from Lesser Slave lake to Whitefish lake passes northerly through this township. It is my opinion that this township will be settled, it having the advantages of good soil, water, plenty of fuel, a good wagon road to enable settlers to reach the township, close proximity to the village of Lesser Slave Lake where hay and grain can be disposed of, while the danger from summer frosts will be no more than other parts

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 14—Continued.

of the country where the farming is successfully carried on. Moose and caribou tracks were observed but scarcely any other game.—*Henry W. Selby, D.L.S., 1906.*

Range 15.

75. East boundary.—This line was run on the ice because its course lay over so much water that it could not be done in the warm weather. Its north end is in Buffalo bay and in running south keeps a short distance west of the main outlet for nearly three miles, where the main land is again reached and a connection made with the survey of the Sucker Creek Indian reserve, No. 150a. The land along this line is not suitable for farming, but the township west is composed mainly of farming and meadow land. Thousands of tons of hay have been cut on these meadows and hundreds of horses range here every season.—*Henry W. Selby, D.L.S., 1906.*

76. This land may be conveniently divided, for the purposes of description, into the north and south halves. The north half, from a height of probably two hundred and fifty feet near the twentieth base line, lies with a general slope towards the south and southeast, where the south half, slightly higher than the waters of Buffalo bay, is met. Parts of sections 7, 18 and 13 being on the high land should not be included with the south half but as they lie mostly within the settlement survey, need not be affected by this division. All the sections north of the settlement survey although heavily wooded with poplar up to twelve inches in diameter, will make beautiful farms when cleared. And as settlement takes place and this wood is cut fires will make prairie land of it. Water was found only in the creeks running in coulées forty feet to fifty feet deep on sections 32, 33, 34 and 27 and this very strongly impregnated with alkaline or mineral taste, evidently fed by springs or underground currents. Springs were noticed on sections 18 and 19 in the settlement, the water of which though tasting of the mineral, was not so strong as in the creeks. Where wells have been sunk the water is quite strong for a while but improves on being used regularly. Wash creek, coming from section 32 and entering the marsh alongside of Heart river in section 22, has a rapid current. It does not average a depth of two inches and a width of two feet and apparently is fed by springs. It flows in a coulée fifty feet deep to the centre of the Indian reserve. Where the banks of the coulée end it has cut a channel and at high water several channels are running. I saw it in June near my camp on section 28 four feet deep and twelve to fifteen feet wide. This was the effect of only two days' rain, and it remained like that for three days before gradually subsiding. It can be imagined what would be the result upon South Heart river, which is only a little over a chain wide and seldom over two feet deep, with a current of about two miles per hour and which winds its way across the south half of this township. Several channels have been made through this low land the soil of which shows that it has been deposited by the ever recurring freshets and which had gradually risen until now the greater part of the low land remains dry at all times, but thousands of acres are still flooded by the sudden pouring of this volume of water into Buffalo bay. These old channels, or partly used channels are in places like rivers without any current, with bars in them where at low water one can cross dry-shod and at time of freshet with the current setting up stream carrying a canoe as fast as it will ordinarily downstream in the main channels. There are now at low water four mouths to South Heart river, and they are emptying such a quantity of silt or deposit into Buffalo bay annually that it remains only a question of time when this bay will become only the channel of South Heart river. In paddling a canoe over the bay at low water the bottom of the bay can be touched at from two to three feet and for a quarter of a mile from shore the water is not over six inches to a foot in depth. This low land at the mouth of South Heart river is very rich and grows great crops of hay besides

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 16—Continued.

channel was so packed with logs and driftwood that it could not get through. Considerable dry timber for fuel can be got throughout the township, but once it begins to fill up with settlers they will be compelled to go south for their firewood. There is some timber in the south tier of sections but it is small and not standing very thick. Vegetation is generally very rank, stock looks well and a large quantity of hay is saved for winter feeding. The soil generally is a loose loam changing from black in the portion liable to flooding to a light loam or clay in those farther from the river. A good wagon road running from Lesser Slave lake to Sturgeon lake passes from east to west through this township and other roads branch off northerly for the use of settlers and to reach Slave lake without crossing so much water. East Prairie river follows a very crooked course with a general trend towards the north near the north end of the township, its channel is not much over half of the width it is in the south, but the current is more rapid. The greater part of the land is drained into East Prairie river through numerous coulees, some having small creeks in them at present, though most of them are dry. I am told that in some of these coulees at the time of high water in the river the water backs up several miles, and crops growing in fields adjoining them are benefited according to their proximity. No rocks or quarries were noticed, or game of any kind.—*Henry W. Selby, D.L.S., 1906.*

75. *Southwest six sections.*—For the present it was thought unnecessary to cut the lines through the balance of this township as much of it is flooded by East Prairie river. These six sections are nearly flat and are composed of prairie with large bunches of willow brush and willow fringed coulees. A quantity of black poplar and spruce is found on the north half of section 4. A sawmill is in operation about a half mile east of the east boundary of section 4 which has been supplied with spruce logs from the land adjacent to the river and its tributaries. This timber is of a good size, but is scattered. Two squatters have made improvements on section 6, but the amount of breaking is small all through this settlement, since the market is very limited. Much progress cannot be looked for without a railway.—*Henry W. Selby, D.L.S., 1906.*

7. The northern two-thirds of this township, with the exception of small portions south of the wagon road to Lesser Slave lake, is well suited for mixed farming and stock-raising. The soil is black loam on clay subsoil, and grass and vetches grow luxuriantly all over it except on the most heavily wooded sections, though not to the same extent that it does in parts of Prairie River settlement. There are two small creeks, one of which rises a short distance north of the base line in the high lands and flows in a coulee about twenty-five feet deep through section 32, where the coulee ends. The other rises in section 36 and flows through sections 35 and 27 in a coulee about twenty feet deep. From these points the coulees become simply rolling country and the creeks find their way to the low lands near Heart river. Many grassy sloughs which are nearly dry this year are found in sections 20, 21, 28 and 29. The settlement survey covers nearly all the prairie sections, but prairie is found sufficient for a good start on sections 16, 17, 18, 20, 21, 22, 27 and 28. On these the land is good, being clay, and black loam on clay subsoil, while the timber is small and not difficult to clear. Bluffs of poplar suitable for building purposes and fuel are on each of these. On the north half of section 17 a piece of breaking of about two acres is fenced, but no buildings have been built and there is no crop in yet. There is a house partially built in the southwest quarter of section 23, but no one resides there. In fact no one lives in this township except one settler on lot 110, one on 108 and one on lot 104, though there are crops growing on several of the settlement lots which the frosts of several cold nights do not appear to have injured. The chord four miles south of the base line runs through the low lands adjacent to Heart river, locally called Horse

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 16—Continued.

lakes when flooded. These basins or lakes were dry last year. In May of this year there was no water to be seen in them. In June the greater part of sections 8, 9, 10, 11 and 14 were covered to a depth of two to four feet of water after a rain of two days duration. In September very little water is to be seen in them. The reason for this flooding appears to be that East and West Prairie rivers flow into South Heart river in township 75, range 16. The quantity of water usually flowing in each of the Prairie rivers is about equal to that flowing in Heart river and the banks of Heart river being only about seven feet high cannot receive this extra flow of water. Consequently it has to overflow, some to the north of Heart river and some into basins south and along the Prairie rivers. This land not being at present suitable for farming or grazing I did not subdivide it. The heaviest timbered sections are 19, 30, 31, 32, 33, 34, 35 and 36; on these the timber is mainly poplar from two inches to twelve inches in diameter, with some willow. On the rest of the township the poplar is small and scattered and mixed with willow. A few trees of spruce and tamarack up to fourteen inches in diameter are seen on the south boundary of section 18 and along the west halves of sections 6 and 7, there are some good spruce and tamarack but only a small quantity and probably more useful for the needs of the settlers than for commercial purposes. No game was seen in this township but among the berry bushes tracks of bear were observed.—*Henry W. Selby, D.L.S., 1906.*

Range 17.

74. Before deciding as to the subdivision of township 74, range 17, after running the east and south outlines, I travelled over a large part of it and for the following reasons decided to subdivide only the east two miles for the present. The main reason being that there is more timber and brush west of Prairie river, than homesteaders care to locate on, until settlers become more numerous. And although in sections 18 to 14 and 19 to 23 there are numerous prairie spots and the grass and vegetation is quite rank and the soil all that could be desired, there are wet sloughs, coulées and some muskegs which make it look uninviting. The southerly third of the township west of the river falls gently towards the north and west, has poplar and willow all over it, and the soil is mostly a white clay with very little loam. The northerly third is more or less heavily timbered and flooded by the high water of West Prairie river, but as this does not often occur, this land may be suitable for stock-raising, but for the ordinary ranch where cattle and horses are supposed to rustle all winter, I do not think this part of the country will be suitable without providing hay for three months when the snow gets a crust on it. Sections 1 to 12 and the west parts of 26 and 35 are covered with poplar and willow and there is considerable willow and a few poplar bluffs scattered over the remainder of this part of the township, but there is not a quarter section of this latter part that has not enough prairie on it to give a settler a good start, as is evidenced by the number of claims already occupied. The peculiar feature of this part of the country is the large number of coulées or water-courses fringed with willow and scattered poplar, which now are nearly dry, but some have old beaver dams across them which hold the water back in ponds. These coulées or ravines appear to have been washed out by the water in the spring, made by the melting snow over an almost level surface, and they run in every direction, many flowing at right angles to others and beginning near others already formed. Some again, show their origin from springs or underground currents, since there is a small stream flowing at all times of the year and the banks of the coulées are constantly sliding in. This would not occur if it were only a watercourse. The vegetation on sections 2, 11, 14, 23, 25 and 36 is decidedly more rank than on the other sections, but from the information to be had it does not appear to be an advantage for where I have seen crops growing and the grass and weeds are not nearly so rank the yield of grain was greater.

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 17—Continued.

The soil where the vegetation grows rank seems more loose and spongy, while in the other case it is closer and more difficult to cultivate. This rank vegetation had to be cut down to get the lines through. Mr. F. Mearon, who has been on the south-east quarter of section 24 for the past three years, has thirty-five acres of land broken and under crop this season. It is well fenced and he has good log buildings, machinery necessary to work his farm with, ten head of horses and four head of cattle. He came there practically without anything, showing what industry and thrift ought to do on such soil. His crop this year is very good, some being so heavy as to lodge. Frost has not injured any of the crops in this township, the potatoes being green in the end of September. Vegetables of all kinds appear to do well and grow to an amazing size and quality. There are plenty of bear along West Prairie river and jumping deer were seen in the township and coyotes are very numerous.—*Henry W. Selby, D.L.S., 1906.*

75. In running the east outline of township 76, range 17, I found the sand hills and spruce muskeg to continue southwesterly to so great an extent and South Heart river and West Prairie river cutting in, several parts and places along these rivers subject to flooding and the land at present unfit for settlement, that I decided not to subdivide it. But when the east outline was run three settlers were found within the first mile west, with valuable improvements and farms of the best quality of soil. Consequently the survey of sections 1, 12, 13 and 24 was completed. The only portions of section 1 not suitable to farm are the two coulées which drain it, and through which spring creeks are running most of the year, furnishing water for the stock owned by the two settlers on the section. The coulées are therefore a benefit instead of otherwise. The crop of oats, wheat and barley grown by Joseph Ferguson on the northeast quarter of section 1 is excellent and when the land is properly worked will greatly improve as the soil is a rich loam on clay subsoil. Grass grows very rank and with it thick masses of vetch and peavine. The settlers can go almost anywhere on the prairie and put up from three to five loads per acre, while stock destroys more than they eat. The water found in the coulées has in most cases an iron or alkaline taste but the well water after being used for a while becomes free from this mineral taste. Many frosty nights have occurred this season, but little or no damage has been done and that little only in case of grain sown late. Garden produce such as potatoes, cabbage, beets, turnips, carrots and lettuce have developed to a perfect state. One has only to observe the condition of the horses, cattle, pigs, &c., to arrive at an opinion as to the rich quality of the soil and its produce. Sections 12 and 13 are equally good as section 1 except that more willow brush is found growing along and between the various watercourses, but the quality of the soil and vegetation would indicate their fitness for farming purposes. A very imperfectly farmed field of oats put in by A. McDonald on these sections has been cut and although not threshed the turnout promises exceedingly well. Section 24 is somewhat cut up by South Heart river and the land adjacent to it is more or less flooded and cut into by the water when the floods subside, but the east half has very little land on it that cannot be farmed and the west half will do for grazing or hay when the brush and timber is cut. The first road into the settlement from the north was opened through this section, being free from danger of flooding from the rise of the water in the rivers.—*Henry W. Selby, D.L.S., 1906.*

Range 19.

64. *North outline.*—In section 34 the line intersects, seven times, Atikkamek ('poisson blanc') creek, a tributary to Atimsegun ('dog's tail') river. This river, after crossing the line near the northeast corner of section 31, flows northwest into

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 19—Continued.

Little Smoky river. The country is flat and swampy in many places. The high land is wooded with spruce six to twenty-four inches in diameter, poplar six to fifteen inches and jackpine five to ten inches, also birch, balsam and fir, while in the swamps there is tamarack six to twenty inches in diameter. The soil is black loam four to eight inches deep with a clay subsoil. The Lake St. Ann pack trail (southern one) to Sturgeon lake passes close to the northeast corner of section 33.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 20.

64. *North outline.*—This township has a gently rolling and wooded surface; there are some tamarack swamps with timber eight to fifteen inches in diameter. The divide between Atimsegun and Little Smoky rivers is in section 31 (altitude 2,350 feet above sea level). Through section 34, flows a creek which empties into lake Giroux whose eastern extremity lies three-quarters of a mile north of the line. This lake is about three miles long by one mile and a half wide, and lies in a northwesterly direction. North of it the land is high and supports a good growth of poplar and spruce, but to the west it appears to be low and swampy. The soil is black loam, four to six inches deep with a clay subsoil. An old pack trail leading north crosses the line in section 35.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 21.

64. (*North outline*).—This township is heavily timbered with spruce ten to thirty inches, jackpine six to twelve inches, and poplar, balsam, fir, birch and tamarack six to ten inches in diameter. Its surface is undulating except in section 33, where steep hills lead down to Little Smoky river (2,050 feet above sea level). This stream, which flows from the southeast, crosses the north boundary of this section three times. It is three chains and a half wide, has a swift current running over a stony bottom, and has high cut banks. It is not navigable. Its valley, which is two hundred feet deep, is about one mile wide between the crests of the hills which bound it on each side. The pack trail (southern one) between Lake St. Ann and Sturgeon lake, passes through section 35, east of Little Smoky river. The soil is a black loam with a clay subsoil; it changes to a sandy loam over a mixture of sand and clay in the valley of Little Smoky river. A few stones were seen on the surface in places. The land west of the river is high, rolling and covered with bad windfall. It is wooded with spruce from ten to thirty inches in diameter, balsam, fir and cottonwood with heavy undergrowth of alders. The soil is a black loam two to six inches deep, over a subsoil of clay mixed with stones or coarse gravel. The general slope of the country is towards the northwest.—*Arthur Saint Cyr, D.L.S., 1906*

80. *North outline.*—The surface is undulating and is well wooded. A hay marsh half a mile long lies one-quarter of a mile south of the base line in section 31. Small streams, tributaries to North Heart river, cross the line in sections 34 and 35. In sections 31 and 32 the subsoil is clay mixed with gravel and stones. In the rest of the range the soil is blue clay covered by a few inches of loam. Throughout this township there are many willow swamps. An Indian pack trail from 'Little Prairie' crosses the line in section 34. Smoky river and the country east of it is now accessible by a wide road which I had to cut in order to reach the initial point of my survey.—*Arthur Saint Cyr, D.L.S., 1906.*

84. Peace river flows from south to north across this township and crosses its north boundary in the middle of section 33. The river is here half a mile wide. From the river the land rises gradually till at one and a half and three-quarters of

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 21—Continued.

a mile from the right and left banks respectively it reaches an altitude of 700 feet. Across the line and close to the right bank lies an island wooded with cottonwood and spruce. East of the river the country is covered with young poplar, willows and alders and broken by deep ravines. Solid timber begins half a mile south of the line and extends southerly to Peace River Landing. The soil is light in the vicinity of the river.—*Arthur Saint Cyr, D.L.S., 1906.*

84. *North outline.*—Peace river flows from south to north across this township and crosses the north boundary in the middle of section 33. The river is here half a mile wide. From the river the land rises gradually till, at three-quarters of a mile from the left bank, it reaches an altitude of seven hundred feet. Across the line, and close to the right bank, lies an island wooded with cottonwood and spruce. East of the river the country is broken by deep ravines and is covered with young poplar and willow and alder scrub. Solid timber begins half a mile south of the line, and extends southerly to Peace River Landing. The soil is light in the vicinity of the river. Where the line intersects the right bank of Peace river I noticed an outcrop of sand stone fifty feet in height. This outcrop extends for a considerable distance on either side of the line. Lying close to the right bank of the river there are also, in this vicinity, many islands, all wooded with cottonwood and black poplar. The middle of township 68, range 21, includes the valley of Peace river, which flows through this township from south to north. This township is consequently much cut by deep and wide gulches, separated by some narrow bench land. The soil in one-half of section 33 and the whole of section 34 is poor. In the other two sections it is a black loam four to eight inches deep, with a clay subsoil. The land is covered with small poplar and willow scrub.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 22.

80. *North outline.*—The height of land between the Smoky and North Heart rivers occurs in section 34. West of this divide, in sections 31, 32 and 33, are many large hay marshes, while east of it the ground slopes gently towards the valley of North Heart river. The land in this range also is wooded with poplar six to ten inches in diameter. There are many willow swamps. The soil is the same as in range 23.—*Arthur Saint Cyr, D.L.S., 1906.*

84. The country is rolling, covered by bad windfall. A pack-trail leading to the Roman Catholic mission crosses the line in the middle of section 34. There is a large hay marsh in section 33 and an extensive muskeg in section 32. The soil is a black loam 2 to 8 inches deep overlying a clay or gravelly clay subsoil.—*Arthur Saint Cyr, D.L.S., 1906.*

84. *North outline.*—The surface is rolling, and is covered by heavy windfall. A pack-trail leading to the Roman Catholic mission crosses the line in the middle of section 34. There is a large hay marsh in section 33, and an extensive muskeg in section 32. The soil is a black loam from two to eight inches deep with a clay or gravelly subsoil.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 23.

80. *North outline.*—Smoky river flows northerly through the middle of this township, and crosses the north boundary a short distance west of the northeast corner of section 33. At this point the river is three hundred and thirty yards wide, and has a swift current flowing over a stony bottom. Precipitous hills rise to a height of seven hundred feet on both sides of this stream whose valley is one mile and a quarter wide.

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 19—Continued.

Little Smoky river. The country is flat and swampy in many places. The high land is wooded with spruce six to twenty-four inches in diameter, poplar six to fifteen inches and jackpine five to ten inches, also birch, balsam and fir, while in the swamps there is tamarack six to twenty inches in diameter. The soil is black loam four to eight inches deep with a clay subsoil. The Lake St. Ann pack trail (southern one) to Sturgeon lake passes close to the northeast corner of section 33.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 20.

64. *North outline.*—This township has a gently rolling and wooded surface; there are some tamarack swamps with timber eight to fifteen inches in diameter. The divide between Atimsegun and Little Smoky rivers is in section 31 (altitude 2,350 feet above sea level). Through section 34, flows a creek which empties into lake Giroux whose eastern extremity lies three-quarters of a mile north of the line. This lake is about three miles long by one mile and a half wide, and lies in a northwesterly direction. North of it the land is high and supports a good growth of poplar and spruce, but to the west it appears to be low and swampy. The soil is black loam, four to six inches deep with a clay subsoil. An old pack trail leading north crosses the line in section 35.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 21.

64. (*North outline*).—This township is heavily timbered with spruce ten to thirty inches, jackpine six to twelve inches, and poplar, balsam, fir, birch and tamarack six to ten inches in diameter. Its surface is undulating except in section 33, where steep hills lead down to Little Smoky river (2,050 feet above sea level). This stream, which flows from the southeast, crosses the north boundary of this section three times. It is three chains and a half wide, has a swift current running over a stony bottom, and has high cut banks. It is not navigable. Its valley, which is two hundred feet deep, is about one mile wide between the crests of the hills which bound it on each side. The pack trail (southern one) between Lake St. Ann and Sturgeon lake, passes through section 35, east of Little Smoky river. The soil is a black loam with a clay subsoil; it changes to a sandy loam over a mixture of sand and clay in the valley of Little Smoky river. A few stones were seen on the surface in places. The land west of the river is high, rolling and covered with bad windfall. It is wooded with spruce from ten to thirty inches in diameter, balsam, fir and cottonwood with heavy undergrowth of alders. The soil is a black loam two to six inches deep, over a subsoil of clay mixed with stones or coarse gravel. The general slope of the country is towards the northwest.—*Arthur Saint Cyr, D.L.S., 1906*

80. *North outline.*—The surface is undulating and is well wooded. A hay marsh half a mile long lies one-quarter of a mile south of the base line in section 31. Small streams, tributaries to North Heart river, cross the line in sections 34 and 35. In sections 31 and 32 the subsoil is clay mixed with gravel and stones. In the rest of the range the soil is blue clay covered by a few inches of loam. Throughout this township there are many willow swamps. An Indian pack trail from 'Little Prairie' crosses the line in section 34. Smoky river and the country east of it is now accessible by a wide road which I had to cut in order to reach the initial point of my survey.—*Arthur Saint Cyr, D.L.S., 1906.*

84. Peace river flows from south to north across this township and crosses its north boundary in the middle of section 33. The river is here half a mile wide. From the river the land rises gradually till at one and a half and three-quarters of

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 21—Continued.

a mile from the right and left banks respectively it reaches an altitude of 700 feet. Across the line and close to the right bank lies an island wooded with cottonwood and spruce. East of the river the country is covered with young poplar, willows and alders and broken by deep ravines. Solid timber begins half a mile south of the line and extends southerly to Peace River Landing. The soil is light in the vicinity of the river.—*Arthur Saint Cyr, D.L.S., 1906.*

84. *North outline.*—Peace river flows from south to north across this township and crosses the north boundary in the middle of section 33. The river is here half a mile wide. From the river the land rises gradually till, at three-quarters of a mile from the left bank, it reaches an altitude of seven hundred feet. Across the line, and close to the right bank, lies an island wooded with cottonwood and spruce. East of the river the country is broken by deep ravines and is covered with young poplar and willow and alder scrub. Solid timber begins half a mile south of the line, and extends southerly to Peace River Landing. The soil is light in the vicinity of the river. Where the line intersects the right bank of Peace river I noticed an outcrop of sand stone fifty feet in height. This outcrop extends for a considerable distance on either side of the line. Lying close to the right bank of the river there are also, in this vicinity, many islands, all wooded with cottonwood and black poplar. The middle of township 68, range 21, includes the valley of Peace river, which flows through this township from south to north. This township is consequently much cut by deep and wide gulches, separated by some narrow bench land. The soil in one-half of section 33 and the whole of section 34 is poor. In the other two sections it is a black loam four to eight inches deep, with a clay subsoil. The land is covered with small poplar and willow scrub.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 22.

80. *North outline.*—The height of land between the Smoky and North Heart rivers occurs in section 34. West of this divide, in sections 31, 32 and 33, are many large hay marshes, while east of it the ground slopes gently towards the valley of North Heart river. The land in this range also is wooded with poplar six to ten inches in diameter. There are many willow swamps. The soil is the same as in range 23.—*Arthur Saint Cyr, D.L.S., 1906.*—

84. The country is rolling, covered by bad windfall. A pack-trail leading to the Roman Catholic mission crosses the line in the middle of section 34. There is a large hay marsh in section 33 and an extensive muskeg in section 32. The soil is a black loam 2 to 8 inches deep overlying a clay or gravelly clay subsoil.—*Arthur Saint Cyr, D.L.S., 1906.*

84. *North outline.*—The surface is rolling, and is covered by heavy windfall. A pack-trail leading to the Roman Catholic mission crosses the line in the middle of section 34. There is a large hay marsh in section 33, and an extensive muskeg in section 32. The soil is a black loam from two to eight inches deep with a clay or gravelly subsoil.—*Arthur Saint Cyr, D.L.S., 1906.*

Range 23.

80. *North outline.*—Smoky river flows northerly through the middle of this township, and crosses the north boundary a short distance west of the northeast corner of section 33. At this point the river is three hundred and thirty yards wide, and has a swift current flowing over a stony bottom. Precipitous hills rise to a height of seven hundred feet on both sides of this stream whose valley is one mile and a quarter wide.

DEPARTMENT OF THE INTERIOR

ANNUAL REPORT

OF THE

TOPOGRAPHICAL SURVEYS

BRANCH

1907-1908

PRINTED BY ORDER OF PARLIAMENT

OTTAWA

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EXCELLENT MAJESTY**

1909

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REPORT
OF THE
SURVEYOR GENERAL OF DOMINION LANDS
1907-1908

DEPARTMENT OF THE INTERIOR,
TOPOGRAPHICAL SURVEYS BRANCH,
OTTAWA, August 31, 1908.

The Deputy Minister of the Interior,
Ottawa.

SIR,—I have the honour to submit the following report on the operations of the Topographical Surveys Branch for the fiscal year ended March 31, 1908.

In what was formerly called the fertile belt, that is to say the country lying south of the North Saskatchewan river, the subdivision surveys are practically completed; in fact they extended for some distance north of the river. The homesteads within this area are being rapidly taken up and the newcomers will soon have to look elsewhere for free lands. What direction settlement will take cannot be foreseen with accuracy; it will depend not only upon climatic and soil conditions as yet imperfectly known, but also upon other considerations such as the opening of communications, building of railroads, &c. The department must be prepared to meet the demand for surveys wherever it arises and for this purpose the initial meridians and base lines have to be located over a very large extent of country. These lines governing all subsequent operations, have to be established with the greatest care and accuracy. The difficulties of transportation are enormous. The lines run through dense woods and the extensive marshes peculiar to the northern country are a great impediment. The progress of the work is slow and as a result the cost is very great. The figures which are given in appendix No. 2 show that it varies from \$79 to \$218 per mile, and averages \$140.

Incidentally it may be mentioned that these surveys are a source of wonder to the inhabitants of the outlying settlements. They cannot understand why survey parties are sent out hundreds of miles away in the wilderness while the settlers are waiting for the subdivision of their lands; the only explanation which occurs to them is that there is gross ignorance at Ottawa of the needs of the West. There is, however no other way of extending the surveys; the benefits of our splendid system of township subdivision are the direct result of these outlying operations.

In comparing items in this report with those in the report for the fiscal year ended March 31, 1907, it is to be noted that in some cases the latter covered a period of nine and in some cases fifteen months, owing to the change then made in the date of the beginning of the fiscal year; in the present report all items are given for a period of twelve months only.

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SURVEYS FOR THE YEAR ENDED MARCH 31, 1908.

The spring of 1907 was very backward and the summer unusually wet, which had the effect of greatly retarding survey operations. The sloughs, creeks and rivers were filled with water, rendering the task of moving an outfit a very difficult one especially in the case of the surveyors paid by the day, who have often long distances to travel from one survey to another. On account of the frequent rains and continuous cloudy weather much difficulty was also experienced in making the necessary observations to determine the astronomical bearings of lines surveyed.

Another cause of trouble to surveyors in charge of parties was the difficulty of retaining the services of good men on their parties under such unfavourable conditions. Owing to the scarcity of feed for horses some surveyors were compelled to close operations much earlier than usual.

The result has been that the amount of survey work done during the year was not as great as estimated at the beginning of the season. The average amount of survey per party, however, compares well with those of previous years.

During the year the complete subdivision was made of two hundred and twenty-three whole and of eighteen fractional townships, while a partial subdivision was made of one hundred and twenty-six other townships. In addition to this a complete resurvey was made of thirty-two whole townships and of one fractional, as well as a partial resurvey of one hundred and thirty-one others.

Sixty-three survey parties were employed, fifty-seven of which were engaged on township work and six on miscellaneous surveys. Of these parties thirty-three were paid by the day while thirty worked under contract.

Of the parties under daily pay, six were employed in Manitoba, four in Saskatchewan, thirteen in Alberta, six in British Columbia, one on the boundary between British Columbia and Yukon Territory and one in the Northwest Territory, while two others were part of the time in one province and part in another. Five of the parties working under contract were located in Manitoba, ten in Saskatchewan and twelve in Alberta, while three were part of the time in one province and part in another.

Five of the parties under daily pay, in charge of Messrs. P. R. A. Belanger, E. W. Hubbell, G. J. Lonergan, Geo. McMillan and O. F. Miles were for the greater part of the season employed in inspecting surveys made under contract, thirty-four of which were examined during the year. In addition to inspection these parties investigated errors reported in survey, and where necessary made corrections. The errors reported in almost every case existed in surveys made years ago when the methods employed were not of a nature to produce the accuracy attained under our present methods.

TOWNSHIP SURVEYS.

The reports of the surveyors working under daily pay are given as appendices No 13 to No. 43. These convey, though inadequately, some idea of the methods of carrying on surveys and the dangers and difficulties encountered.

Mr. Johnson in his report says, 'To those who have packed steadily for a month over high mountains any description is superfluous, and, to those who have not, no words of mine could make them realize what it is like.'

The field of survey operations extended from the eastern boundary of Manitoba to the western boundary of Alberta, and in the railway belt as far west as the Pacific ocean. It also extended from the international boundary as far north as the twenty-second base line, about 500 miles.

Mr. O. F. Aylsworth, D.L.S., who was employed on resurvey work in eastern Manitoba, reports that the country around Beauséjour is not very thickly settled, as the land is partly boggy and in many places very stony. A great many large ditches have recently been dug which render land, formerly flooded, now fit for cultivation.

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Mr. B. J. Saunders, D.L.S., was engaged on surveys of block outlines in eastern Manitoba in the vicinity of Fort Alexander. This settlement which is an old Hudson's Bay trading post is very prosperous and is well equipped with schools, churches, saw-mills, &c. The Indians of the adjoining reserve are very industrious and find employment in fishing, cutting cord-wood and railway ties, and other similar work.

About thirty miles north of Fort Alexander there is a gold prospect which has made but little progress owing to lack of capital. During the past winter an iron ore location was being worked on Black island at the mouth of Manigotagan river.

Mr. C. E. Bourgault, D.L.S., was employed on survey work around the south end of lake Manitoba. He also did some resurvey near the town of Sewell, and retraced the colonization road north from Teulon.

Base line work in central Manitoba was done by Mr. W. Christie, D.L.S.

Mr. W. J. Deans, D.L.S., made some correction and retracement surveys along the second meridian. He remarks on the phenomenal growth of the town of Yorkton since his former visit there in 1899. The surrounding country contains several well cultivated farms, while the farmhouses are fitted up with many modern conveniences.

Mr. W. R. Reilly, D.L.S., made some surveys along the Saskatchewan river near the fourth meridian. The soil is good for growing wheat, but early frosts are apt to do some damage occasionally. Mr. Reilly advocates mixed farming as being more profitable, for if the wheat be damaged the farmer has something to fall back on.

Mr. David Beatty, D.L.S., resurveyed some townships in eastern Alberta about one hundred and fifty miles north of Medicine Hat. He speaks of the generally good quality of the soil, but reports a scarcity of good water.

Mr. L. E. Fontaine, D.L.S., was engaged in making a traverse and taking levels of Milk river along its course through Canadian territory.

Mr. T. A. Davies, D.L.S., was employed on retracement and correction surveys in central Alberta.

Mr. C. O. Smith, D.L.S., made some subdivision and resurveys in southern Alberta west of Macleod. This is the great ranching country of the West, but it is fast being fenced up into farms. The land is good and easily worked. Timber for fuel and building purposes can be easily obtained in Porcupine hills, and all conditions tend to make the district very desirable for homesteading.

Mr. W. F. O'Hara, D.L.S., who was working in the Pincher Creek district, reports the existence of a large oil-field, the development of which is yet in its initial stage, although the companies operating there have met with very encouraging results. From tests which have been made the petroleum is said to be of the highest grade.

Mr. W. T. Green, D.L.S., was working in the foothills south of Calgary. He speaks of the extraordinary growth of the town of Claresholm. Five years ago this place could boast of only a station-house, while to-day it is a thriving centre of industry. The surrounding country consists of the best of land, well watered, and suitable for either farming or ranching.

Base line surveys west of the fifth meridian were performed by Messrs. A. H. Hawkins, D.L.S., and Geo. Ross, D.L.S. Mr. Hawkins produced the thirteenth base and Mr. Ross the fourteenth.

Mr. A. Saint Cyr, D.L.S., ran the sixth meridian south from the sixteenth base line to Bullrush mountains. Some idea of the difficulties encountered by surveyors may be obtained from a perusal of his report. He was forced to travel from Edmonton around by Lesser Slave lake in order to reach his destination, as the snow was too deep and feed too scarce to travel directly west to the sixth meridian. As the snow had not yet melted in the bush and the ice along the route was in a treacherous condition it was necessary for him to carry both sleds and wagons in his outfit. To add to the difficulties of his journey some of the ferry boats had been swept away by the high spring floods, which rendered fording the rivers difficult and dangerous. Bad

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trails up steep hills often covered by fallen trees to a height of several feet also retarded his progress considerably.

Mr. J. B. Saint Cyr, D.L.S., was employed on subdivision and settlement surveys around Dunvegan and Peace River crossing. The fact that surveys are required so far north goes to prove the extensive settlement of the west. The soil in the Peace River district is of the best quality and the oats and wheat grown are of the highest grade. Timber for fuel and building purposes is easily obtained and the district bids fair to become one of the most prosperous in the west.

Mr. A. W. Ponton, D.L.S., was engaged on the production of the fifth meridian from the twentieth to the twenty-second base line.

Surveys required around the west end of Lesser Slave lake were performed by Mr. H. W. Selby, D.L.S. This district being so far north is generally considered to be subject to summer frosts, but Mr. Selby reports that very little damage was done by frost there last year, although much damage was done in other districts of the west farther south. The great drawback to the settlement of the country is the lack of railroad transportation.

BRITISH COLUMBIA SURVEYS.

During the season of 1907, three regular parties were employed on numerous scattered surveys within the railway belt of British Columbia. In all, 530 miles of line were run, generally in very rough country. On this work Mr. J. E. Ross, D.L.S., spent nearly eleven months, and Mr. A. G. Stacey, D.L.S., eight months, while Mr. A. W. Johnson, D.L.S., took the field early in March and returned in August. The details of these surveys will be found in the reports of the surveyors and elsewhere in this volume. The excessive amount of field work does not leave to these surveyors much time for the completion of their returns, and it is probable that at least one more party will be required during the coming season. Mr. Ross was engaged on survey work east of Kamloops, while Mr. Stacey was employed on surveys west of Kamloops. This city is the distributing centre for the north Thompson district and is a place of considerable activity. It operates its own electric lighting plant and waterworks system and has the provincial asylum and hospital located there. The town of Ashcroft is situated about forty miles west of Kamloops. All traffic for the northern interior passes through this place, and great freight wagons, drawn by four or five teams, and a well-equipped stage travel two hundred and fifty miles north.

Vegetation in the Kamloops district is several weeks ahead of that in Ontario, and where irrigation is employed the soil proves very productive. Fruit raising is a very important and growing industry, and of late years exhibits from this district have carried off the highest awards at international exhibitions on both sides of the Atlantic.

Mr. Johnson made some surveys in the railway belt between Yale and Port Moody.

MISCELLANEOUS SURVEYS.

Mr. P. A. Carson, D.L.S., continued the triangulation in the railway belt north-east from Beavermouth.

Mr. A. O. Wheeler, D.L.S., made a photographic survey of the railway belt in the Dogtooth and Selkirk mountains for mapping purposes.

Mr. Lewis Bolton, D.L.S., was engaged in settlement surveys around The Pas and Cormorant lake

Mr. W. Thibaudeau, C.E., made a preliminary investigation of the water-power on the Winnipeg river from the eastern boundary of Manitoba to lake Winnipeg. In this district there is a large amount of spruce and poplar suitable for the manufacture of pulp and the falls along Winnipeg river furnish an unlimited amount of

SESSIONAL PAPER No. 25b

power for the development of the pulpwood industry. Little was known of the value of this water-power except by some companies in Winnipeg who secured sites along the river, built a control dam at Kenora to regulate the flow of water in the river, established generating stations and supplied power to the city of Winnipeg at a very small cost. It was accordingly deemed advisable to ascertain the available water-power on this river and Mr. Thibaudeau was sent to investigate it. Comparing the water-power on the Winnipeg river with that on the Niagara the former is about forty-three per cent of that available on the Canadian or Horseshoe falls, but it is more advantageous on Winnipeg river as it is distributed over a very large area.

Mr. J. N. Wallace, D.L.S., ran part of the boundary between British Columbia and Yukon Territory in the neighbourhood of the Dalton trail.

The country along the line of the Grand Trunk Pacific railway west of the subdivided townships was explored by Mr. P. G. Stewart. He travelled through twenty-six townships between ranges 7 and 16, and townships 51 and 57 west of the fifth meridian. The country generally is rolling, partly opened and partly timbered with poplar, spruce and jackpine. On the hills the land is sandy, while in the valleys it is clay loam. The hills range as high as three hundred feet, while the valleys generally are about six hundred feet wide. Some of the valleys along the larger streams, such as the McLeod river, are about half a mile wide. Mr. Stewart estimates the amount of timber in the townships explored at between two hundred and thirty and two hundred and forty million feet.

The following is a comparison of the mileage surveyed since 1905:—

	April 1, 1907, to Mar. 31, 1908.	Jan. 1, 1906, to Mar. 31, 1907.	Jan. 1, 1905, to Dec. 31, 1905.
	Miles.	Miles.	Miles.
Township outlines.....	1,674	1,306	1,591
Section lines.....	13,710	8,962	10,544
Traverse.....	3,193	1,848	1,809
Resurvey.....	2,917	4,948	2,579
Total for season.....	21,494	17,064	16,523
Number of parties.....	59	56	46
Average miles per party.....	364	305	359

The following table shows the mileage surveyed by the parties under daily pay and by the parties under contract:—

Work of parties under daily pay.

	April 1, 1907, to Mar. 31, 1908.	Jan. 1, 1906, to Mar. 31, 1907.	Jan. 1, 1905, to Dec. 31, 1905.
	Miles.	Miles.	Miles.
Township outlines.....	542	756	1,008
Section lines.....	975	1,035	939
Traverse.....	1,313	643	421
Resurvey.....	2,782	4,815	2,499
Total for season.....	5,612	7,249	4,867
Number of parties....	29	29	26
Average miles per party.....	194	250	187

Work of parties under contract.

	April 1, 1907, to Mar. 31, 1908.	Jan. 1, 1906, to Mar. 31, 1907.	Jan. 1, 1905, to Dec. 31, 1905.
	Miles.	Miles.	Miles.
Township outlines.....	1,132	550	583
Section lines.....	12,735	7,927	9,605
Traverse	1,880	1,205	1,388
Resurvey	135	133	80
Total for season.....	15,882	9,815	11,656
Number of parties....	30	27	20
Average miles per party ...	529	364	583

NOTE.—Owing to the nature of their work, the parties under Messrs. P. A. Carson, P. G. Stewart, W. Thibaudeau and A. O. Wheeler are not included in the statement of mileage for the year ended March 31, 1908.

The following statement shows the average cost per mile of surveys done by contractors and by surveyors under daily pay for the year ended March 31, 1908:—

	Surveys made under day pay.	Surveys made by contract.
Total mileage surveyed.. . . .	5,612	15,882
Total cost.. . . .	\$247,220 96	\$336,230 08
Average cost per mile.. . . .	\$44 05	\$21 18

DESCRIPTIONS OF TOWNSHIPS.

Descriptions of the townships subdivided have been compiled from the surveyors' reports received during the year ended March 31, 1908. They are given as Appendix No. 44. The townships are put in order of township, range and meridian, and the descriptions are preceded by a list of all townships described.

A map accompanying this report shows all the townships in the provinces of Manitoba, Saskatchewan and Alberta subdivided prior to April 1, 1907, coloured in buff, those subdivided between April 1, 1907, and March 31, 1908, are shown in green, while those resurveyed during the same period are shown in red.

REMUNERATION OF SURVEYORS.

At the inception of the survey of Dominion lands, nearly forty years ago, Dominion land surveyors were paid five dollars per day. Shortly after six dollars per day was allowed to surveyors of base lines. These rates remained in force until 1901, when they were increased to \$6.50 and \$7.50, respectively. The advance proved inadequate; in order to induce properly educated men to qualify as Dominion land surveyors, so that there should be no difficulty in securing the services of competent surveyors when they are wanted, a further increase to \$8 and \$10, respectively, was granted by Order-in-Council of March 30, 1908. The increase, it will be observed, is for ordinary surveyors 60 per cent over the rate of forty years ago; for surveyors of base lines it is a little over 60 per cent. Considering the enhanced cost of everything, the increase does not appear too large. By the same Order-in-Council the salary of the inspectors of surveys was fixed at \$9 per day in the field and \$5 per day at office work.

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RESERVATION FOR ROADS.

The system of survey of Dominion lands provides road allowances along section lines. When a section line strikes a lake, the cut banks of a river or other obstacle, the road has to be located elsewhere. The location of these deviations is placed under the control of the provinces by the Manitoba Supplementary Provisions Act and the Saskatchewan and Alberta Roads Act. It was represented that the establishment of these deviations involved great expenditure, and that a considerable part of this expenditure consisted in payments for the land to homesteaders and others who, although directly benefited by the new road, frequently exacted a large price for land which they had just acquired for nothing or at a small price. This difficulty was adjusted by Order-in-Council of November 20, 1907, which directs that every homestead entry shall be granted and every lease or sale of Dominion lands made subject to the right of the province to take, without compensation, such land as may be required for road purposes, not exceeding $2\frac{1}{2}$ per cent of the area of such Dominion lands.

STAR DIAGRAMS FOR LATITUDE OBSERVATIONS.

In extending the principal meridians and the base lines, surveyors have to observe the latitude from time to time for the purpose of checking their measurements and detecting accidental errors. The most convenient and precise method of observation for this purpose is known as Talcott's method, and consists in measuring differences of stars' zenith distances. The new model of transit theodolite for base lines has been especially designed to make use of this method. The most tedious part of a latitude observation by Talcott's method is the preparation of the observing list, especially when several star catalogues have to be consulted. To facilitate the preparation of these observing lists and save the surveyor's time, star charts have now been compiled. By the use of these charts an observing list of stars for the hours of darkness may be prepared in a very short time. These charts give the mean places of all stars up to and including the fifth magnitude listed in the Berliner Jahrbuch, Greenwich Ten Years' Catalogue of Stars for 1890 and Ambronn's Sternverzeichniss for 1900. Stars smaller than fifth magnitude are not visible with the telescope of the base line transit theodolite. The charts are in four sets of six hours' right ascension each, as follows: No. 1, 0 to 6 hours; No. 2, 6 to 12 hours; No. 3, 12 to 18 hours; No. 4, 18 to 24 hours. Each set consists of two sheets, an upper and a lower, each 16 inches by $19\frac{1}{2}$ inches, the lower sheet of thick opaque paper printed in black and the upper sheet of thin transparent paper printed in red. Each sheet is ruled in sections, the arguments being the star's declination for the horizontal lines and right ascension for vertical lines.

As the sections are roughly one-half inch in declination by three-eighths of an inch in right ascension, interpolation by the eye to the nearest ten minutes in declination and the nearest two minutes of time in right ascension is quite easy. On the lower sheet the mean places of stars from 5° south declination to 65° north declination are plotted in their correct positions, the declinations increasing from bottom to top. On the upper sheet are plotted stars from 45° north declination to 90° with the lower transits of stars from 65° north to 90° , the declinations increasing from top to bottom. The right ascensions increase the same from left to right on upper and lower sheets. One symbol is used for stars from 0.0 to 1.0 magnitude, another for stars from 1.1 to 2.0 and so on a different symbol being used for every magnitude. This is of great assistance in quickly identifying the star when afterwards looking for it among the different star catalogues. If now the transparent or upper sheet is placed on the opaque or lower sheet so that the horizontal lines of the upper sheet for that particular declination which is equal to the latitude is directly over the same line of declination through its whole length on the lower sheet, all stars on the upper and lower sheets on the same horizontal lines have the same zenith distance north and south from the observation spot, the black symbols showing through from the lower

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sheet representing stars of south zenith distance and the red of upper sheet stars of north zenith distance. The vertical lines show the times of transit of the several stars. Hence the working methods:—The approximate latitude of the observation spot and the hours of right ascension during which it is desired to observe being known, those sets are selected which include the desired hours of right ascension. Place the upper sheet of each set on the lower with the vertical or right ascension lines corresponding and bring into coincidence the horizontal or declination line of both sheets for that particular declination which is equal to the latitude. Then select those pairs of south and north zenith stars within the limits of right ascension desired whose zenith distance is not too great, whose difference of zenith distance is no more than one-half the run of the micrometer and which have a suitable interval between transits. Having taken out the stars for limits of time allowed, there will probably be found long intervals in places between different pairs. These may be filled in by extending the limit allowed for the difference of zenith distance to the full run of the micrometer. The pairs having thus been selected, the stars are identified in the several catalogues, and their mean places in right ascension and declination are deduced from the epoch of the star catalogue to the beginning of the year which is sufficiently close for the purposes of the observing list.

CORRESPONDENCE.

The correspondence consisted of :

Letters received..	10,092
Letters sent..	12,942

The staff consists of the secretary, one clerk, four stenographers and typewriters and two messengers.

ACCOUNTS.

The accountant's record shows :

Number of accounts dealt with..	633
Amount of accounts..	\$766,000
Number of cheques forwarded..	3,051

The staff consists of an accountant and an assistant accountant.

OFFICE STAFF.

A list of the office staff of the Topographical Surveys Branch at Ottawa is given as Appendix No. 10.

Many changes have taken place during the year. In the Metcalfe street office Mr. F. Lynch has been added to the secretary's staff and Mr. A. Paquette has been appointed messenger in place of Mr. J. J. O'Leary, who was transferred to the School Lands Branch. Messrs. A. G. Stacey, H. L. Seymour, C. C. Fitzgerald, M. Kimpe, E. H. Phillips, J. M. Empey, R. B. Owens, J. N. Goodall, R. V. Heathcott, J. W. Rochon, F. L. Marriott, H. J. Smith, J. C. Ball and S. H. Shore have resigned. Messrs. F. G. D. Durnford and E. E. Brice have been transferred to the Lands Patent Branch and Messrs J. M. Mudie and W. O. Gillis to the survey records office. Mr. Gillis was appointed to the Metcalfe street office during the year, as were also Messrs. A. Vickery, H. P. Moulton and N. Bawlf all three of whom subsequently resigned. Miss A. Whitehead was employed for a short time during the year as extra typewriter. Messrs. F. W. Rice, A. L. Cumming, W. I. MacIlquham, E. M. Dennis and G. B. Dodge have been absent part of the time acting temporarily as assistants to surveyors, while Messrs. W. T. Green, D.L.S., P. A. Carson, D.L.S., and T. A. Davies, D.L.S., have also been absent part of the time in charge of survey parties in the field.

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The additions to the staff during the year are as follows: In the Metcalfe street office, Messrs. A. D. McRae, A. G. Stewart, A. W. Grant, E. C. Rochon, M. J. McLaughlin, G. A. Gaudry, A. Vickery, H. P. Moulton, W. C. Gillis, N. Bawlf, J. R. Akins, F. H. Maynard, H. S. Day, H. E. Sutherland, F. H. Kitto, L. Goodday, F. H. H. Williamson, G. C. Webb, C. H. Wilding, R. P. Bray, E. W. Harrison, A. W. Ault, C. B. Binks, C. H. Holbrook, R. J. Dawson, Jas. Watters and E. Davy; in the office of the geographer, Messrs. J. Beveridge, J. P. McElligott, J. Pigeon and J. R. Merrifield; and in the lithographic office, Mr. J. H. Deslauriers.

OFFICE OF THE CHIEF DRAUGHTSMAN.

A summary of the work executed in the office of the chief draughtsman is given as Appendix No. 5.

The last twelve months have seen a considerable increase in the draughtsmen's work. This is due partly to the fact that the surveys were on a larger scale, but perhaps still more to the constant increase in the miscellaneous business of the office, such as answers to inquiries, both from inside and outside the department, as to surveys made or proposed, areas, corner monuments, errors found or suspected in lines, petitions for resurveys, etc. The draughting office has gradually become of late years, and unavoidably so, to a great extent a correspondence office, a large portion of the letters sent out having to be drafted in this part of the branch.

The staff is larger by three than at the date of the last report, now including eighty-one men, whose time is fully occupied with necessary work in connection with the surveys. The frequent changes of personnel and the location of a part of the force in a separate building at some distance is still the cause of a certain amount of delay, and makes proper oversight of business more difficult. The staff is distributed in five divisions.

First Division—Instructions and General Information.

The staff of this division, which consists of nineteen employees, is in charge of Mr. T. E. Brown, B.A. Instructions were drafted for eighty-one survey parties, which involved the preparation of 879 sketches and 77 tracings and maps; 1,002 progress sketches were received from surveyors in the field, as well as 577 books of field notes, 334 plans, 56 timber reports and 473 statutory declarations; 494 books of field notes of township surveys were transmitted to the survey records office after complete examination, also 476 notes and plans of miscellaneous surveys. Plans were printed for 518 townships, 5 settlements or townsites and 59 sectional sheets. Preliminary plans of 369 townships were issued. A noteworthy feature about the work of this division is the great increase in the number of communications on miscellaneous subjects received and dealt with. The number for the year was 1,296, involving the preparation of 283 sketches and 77 maps and tracings; 3,427 draft letters and memoranda were written.

Second Division—Examination of Surveyors' Returns.

This division is in charge of Mr. T. S. Nash, D.L.S., and the staff consists of twenty-eight employees. The returns of all the surveys of Dominion lands in Manitoba, Saskatchewan and Alberta are examined here. Plans of these surveys are compiled and the accounts for the surveys performed under contract are made out.

Surveyors are required to send in from time to time sketches showing the progress of their work in the field. These sketches show the bearings and lengths of all the lines that have been surveyed together with all the important topography of the country. If on examination they are found incomplete, supplementary sketches are required from the surveyor. During the year 722 progress sketches were examined. When the final returns of surveys are received they are given a cursory examination,

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claims, provincial lots, &c., have to be given that a plan, made to a scale of forty chains to one inch, is too crowded and indistinct. To obviate this difficulty in such cases, plans of quarter townships are made on a scale of twenty chains to one inch, which show the information clearly and make more useful plans. During the year 573 letters and memoranda have been received and dealt with, 830 sketches and plots made, sixty plans compiled for printing and 709 draft letters and memoranda prepared.

Fifth Division—Mapping.

The number of employees in this division is ten, the staff being in charge of Mr. J. Smith. The principal work of the fifth division is the preparation of sectional maps for publication, as shown in Appendix No. 6 and the registering and compiling of surveys in the Yukon Territory as shown in appendices Nos. 3 and 4.

In addition to the above, other maps that may be required by the department are drawn and proofs of maps being printed are examined.

The method of producing a sectional map is as follows: All available information, such as Dominion lands surveys, railroad locations, road surveys, &c., is drawn on good mounted paper on a scale of two miles to an inch; a clean tracing on cloth is then made, reproduced and printed by photo-lithography on a scale of three miles to an inch, then a reduced copy is made by photo-lithography on a scale of six miles to an inch.

During the present rapid development of the northwest provinces these prints are quickly 'out of date' and another edition becomes necessary. The original drawing is then revised, all new information being added and corrections made, the tracing is then corrected to agree with the original and the printing is repeated.

The corrections sometimes entail so much erasing, on the original and tracing, that after a few editions it is necessary to make entirely new drawings. During the past year two originals and four tracings had to be redrawn on this account.

The work on the Yukon surveys consists of keeping a register of all returns of surveys received, the examination of the field notes and plans and the plotting of the work on a general plan so as to show the relative positions of different claims and to ascertain if they encroach on claims previously surveyed. The plans accompanying the surveyors' returns are usually on a scale of two hundred feet to an inch and the general plan on a scale of forty chains to an inch.

In addition to the sectional maps and Yukon work a map of Churchill harbour was drawn for photo-lithography and a large diagram was made for office use showing the closings of surveys on base lines from the sixteenth to the twentieth base between the fifth and sixth meridians.

SURVEY RECORDS OFFICE.

A card system of indexing files relating to trails and roadways, in the provinces of Manitoba, Saskatchewan and Alberta, has been introduced. All communications in connection with these trails or roadways and the preparation of replies giving the areas deducted from the different quarter sections affected, as given by the Patents branch, are dealt with in this office. As the files are kept in this office and are rapidly increasing in number, the index above referred to enables us to readily find the correspondence relating to any of these trails or roadways.

A loose leaf alphabetical index of the plans kept in this office, numbering about 14,000, has been established, which enables a ready reference to all the plans recorded. The installation of these indexing systems was rendered necessary by the large increase in volume of the work of the office.

The following plans, showing the Dominion lands agencies, were prepared in this office and forwarded to their respective destinations:—

1. Five homestead maps showing Dominion lands agencies and sub-agencies in the provinces of Manitoba, Saskatchewan and Alberta.

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2. Thirteen homestead maps showing on each one sub-agency and the lands district agency to which it is subordinate.

3. Sixteen maps on a scale of one mile to an inch showing on each one sub-agency of Dominion lands, with the lands disposed of as shown on the latest homestead map preceding the date of compilation.

All these maps are mounted and bound on cotton for the use of the different agents in the provinces of Manitoba, Saskatchewan and Alberta.

A statement of the work executed by this office during the year is given in Appendix No. 7.

PHOTOGRAPHIC OFFICE.

The amount of work executed in the photographic office during the year has been the largest in the history of the office. Several changes are being made in the equipment, which it is hoped will result in a further increase in the quantity of work and an improvement in quality.

The photo-zincograph process has produced a marked improvement in the plans turned out. A new power press now being installed in the lithographic office for handling large plates will, it is expected, result in a still greater improvement.

During the summer one of the photographers made a trip through Nova Scotia for the purpose of procuring for the immigration branch photographs illustrative of the industries of the province. Hitherto they had to depend for these photographs on the local photographers, and the results were not always satisfactory.

A schedule of the work executed in the photographic office is given as Appendix No. 8.

LITHOGRAPHIC OFFICE.

This office was equipped with a power press and several hand presses. The increase of the work has been such that a second power press became necessary; this is now being installed. It is a rotary transfer press, taking zinc plates 28 x 48 inches. The impression is transferred from the zinc to a rubber blanket and from the latter to the paper. As an adjunct to the press, a machine for graining zinc plates had to be set up, as well as a large flat bed-press equipped with an electric motor. It is hoped that when the whole is in proper working order any lithographs that may be required will be turned out with despatch and efficiency.

The new power press requires two additional men—a printer and a feeder. One of the vacancies has already been filled by the appointment of J. H. Deslauriers as transferrer; he takes the place of J. Bergin, who has been put in charge of the press as printer. By reason of the general increase in the work, another lithographic artist will be needed; this will bring the staff to nine, as follows:—

One foreman.

Two lithographic artists.

One transferrer.

Two power press printers.

Two power press feeders.

One stone polisher and zinc grainer.

Part of the plant had to be placed in the Imperial Building on Queen street, which is somewhat inconvenient.

A statement of the work executed is given as Appendix No. 9.

GEOGRAPHIC BOARD.

Mr. A. H. Whitcher, D.I.S., the secretary, is attached to the staff of the Surveyor General. The board consists of representatives from the different departments, and its duties are to decide the proper spelling of names throughout the Dominion. The

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H. M. R. Soars, Edmonton, Alta.
 W. M. Stewart, Hamilton, Ont.
 A. S. Stewart, Edmonton, Alta.
 I. J. Steele, Ottawa, Ont.
 W. H. Young, Lethbridge, Alta.

At the February examination one candidate took Part I of the D.T.S. examination. He was not successful.

Oaths of office and allegiance and bonds for the sum of one thousand dollars each as required by clause 36 of the Dominion Lands Act were received from twenty-one candidates who had previously passed the necessary examinations for commissions as Dominion land surveyors and had complied with the other requirements of the Act.

Eighteen commissions as Dominion land surveyors were issued as follows:—

E. P. Bowman, West Montrose, Ont.
 F. F. Clarke, Toronto, Ont.
 P. C. Coates, Golden, B.C.
 A. J. Elder, Ottawa, Ont.
 A. C. Garner, South Qu'Appelle, Sask.
 R. V. Heathcott, Edmonton, Alta.
 M. Kimpe, Edmonton, Alta.
 F. H. Kitto, Edmonton, Alta.
 H. F. J. Lambart, Ottawa, Ont.
 A. J. Latornell, Edmonton, Alta.
 J. E. Morrier, Ottawa, Ont.
 G. B. McColl, Winnipeg, Man.
 N. Ogilvie, Ottawa, Ont.
 W. M. Stewart, Hamilton, Ont.
 W. H. Waddell, Hamilton, Ont.
 J. Waldron, Moosejaw, Sask.
 E. W. Walker, Regina, Sask.
 W. H. Young, Lethbridge, Alta.

Every Dominion land surveyor in active practice is required by clause 47 of the Dominion Lands Act to be in possession of a subsidiary standard measure of length furnished by the secretary of the board of examiners. Nineteen such standards were issued directly to surveyors during the year, and 24 were supplied to the Surveyor General of British Columbia for use by the surveyors of that province.

A list of the surveyors who have been furnished with standard measures up to March 31, 1908, will be found in Appendix No. 11.

The correspondence of the board amounted to:—

Letters, &c., received..	1,328
Letters sent..	1,050

The examination questions used at the examination in February, 1908, are submitted as Appendix No. 12.

A meeting of the board was called on April 29 to make arrangements for the special examination in May. The affidavits of the candidates for the final examination were received, and several communications disposed of.

At the meeting from May 2 to June 3, 31 candidates presented themselves for examination. The answer papers of these were read, and the revision of the curriculum of studies for the D. T. S. examination, which had been begun at the February meeting, was completed.

The meeting of November 12 was called to deal with several communications to the board.

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At the meeting of December 4 the interpretation of clause 82 of the Dominion Lands Act was discussed. The question had been referred to the Deputy Minister of Justice, who gave as his opinion that graduates in surveying within the meaning of clause 82, are not required to pass any examination previous to being articulated. The Dominion Lands Surveys Act, which came into force on March 17, 1907, makes it clear that all must now take this examination.

At the meeting in February 130 candidates were examined, the largest number that has ever appeared before the board.

The Dominion Lands Surveys Act removed certain privileges formerly granted by the Dominion Lands Act to surveyors from other parts of His Majesty's dominions who desire to qualify as Dominion Land Surveyors; and the rules of the board had to be amended accordingly. Another amendment to the rules prescribes the use of Chambers' tables at all examinations before the board.

APPENDICES.

The following schedules and statements are appended:—

No. 1. Schedule of surveyors employed and work executed by them from April 1, 1907, to March 31, 1908.

No. 2. Schedule showing for each surveyor employed from April 1, 1907, to March 31, 1908, the number of miles surveyed, of township section lines, of township outlines, traverses of lakes and rivers and resurvey; also the cost of same.

No. 3. List of lots in the Yukon Territory surveys of which have been received from April 1, 1907, to March 31, 1908.

No. 4. List of miscellaneous surveys in the Yukon Territory, returns of which have been received from April 1, 1907, to March 31, 1908.

No. 5. Statement of work executed in the office of the chief draughtsman.

No. 6. List of new editions of sectional maps issued from April 1, 1907, to March 31, 1908.

No. 7. Statement of work executed in the survey records office from April 1, 1907, to March 31, 1908.

No. 8. Statement of work executed in the photographic office from April 1, 1907, to March 31, 1908.

No. 9. Statement of work executed in the lithographic office from April 1, 1907, to March 31, 1908.

No. 10. Names and duties of employees of the Topographical Surveys branch at Ottawa.

No. 11. List of Dominion Land Surveyors who have been supplied with standard measures.

No. 12. Examination papers of the board of examiners for Dominion Land Surveyors.

No. 13 to 43. Reports of surveyors employed.

No. 44. Descriptions of surveyed townships submitted by Dominion Land Surveyors from April 1, 1907, to March 31, 1908.

MAPS.

The following maps accompany this report.

1. Map showing surveys and resurveys made from April 1, 1907, to March 31, 1908.

2. Topographical Survey of Canada,—Trigonometrical sections,—triangulation in British Columbia to accompany the report of P. A. Carson, D.L.S.

3. Topographical map of part of the main range of the Rocky Mountains adjacent to the Canadian Pacific railway to accompany the report of A. O. Wheeler, D.L.S.

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4. Map showing part of the sixth meridian, north of Jasper House, to accompany the report of A. Saint Cyr, D.L.S.

5. Plan of part of the province of Manitoba showing the water-powers on the Winnipeg river to accompany the report of W. Thibaudeau, C.E.

6. Map showing the drainage basin of the Winnipeg river to accompany the report of W. Thibaudeau, C.E.

7. Map of the Winnipeg river from lake Winnipeg to English river, and from English river to First fall, to accompany the report of W. Thibaudeau, C.E.

8. Plan of a group of eight falls on the Winnipeg river to accompany the report of W. Thibaudeau, C.E.

9. Diagram of the Winnipeg river showing cross-section, discharge, &c., to accompany the report of W. Thibaudeau, C.E.

10. Profile of Winnipeg river from lake Winnipeg to English river and Pinawa channel to accompany the report of W. Thibaudeau, C.E.

I have the honour to be, sir,

Your obedient servant,

E. DEVILLE,

Surveyor General.

TOPOGRAPHICAL SURVEYS BRANCH.
SCHEDULES AND STATEMENTS.

APPENDIX No. 1.

SCHEDULE of Surveyors employed and work executed by them, from April 1, 1907, to March 31, 1908.

Surveyor.	Address.	Description of Work.
Aylsworth, C. F	Madoc, Ont.	Resurvey of parts of townships 14, 15 and 16, range 7, and parts of townships 15, 16 and 17, range 8, all east of the principal meridian.
Baker, J. C.	Vermilion, Alta.	Contracts Nos. 2 and 24 of 1907 ; subdivision of townships 53, ranges 10, 11, 12, 13 and 17, townships 54, ranges 9 and 10, the southerly two-thirds of townships 54, ranges 11, 12, 13, 14, 15 and 16, the northerly two-thirds of township 53, range 16, and the east outlines of townships 55 and 56, ranges 10 and 11, and townships 53, ranges 14 and 15, all west of the fifth meridian.
Beatty, David	Parry Sound, Ont.	Retracement survey of townships 27, 28, 29, 30 and 31, range 6, townships 27 and 28, range 7, and traverse in township 32, range 6, west of the fourth meridian ; retracement and restoration survey in township 50, range 27, west of the third meridian.
Belanger, P. R. A	Ottawa, Ont.	Inspection of contracts Nos. 17, 18 and 19 of 1906, Nos. 2, 16, 22 and part of 24 of 1907, completion of inspection of contracts Nos. 16 and 21 of 1906. Miscellaneous surveys between the second and third meridians and retracement in township 53, range 3, west of the fifth meridian.
Bolton, Lewis	Listowel, Ont.	Miscellaneous surveys at The Pas and along Cormorant lake, in the Northwest Territories.
Bourgault, C. E.	St. Jean Port Joli, Que.	Subdivision and resurvey in townships 14 and 15, range 5, and township 14, range 6 ; retracement survey in townships 18 and 22, range 4, township 19, range 3, townships 21 and 22, range 5, and township 22, range 6 ; resurvey of the north boundary of Spruce Woods timber reserve in townships 10, ranges 15 and 16, all west of the principal meridian. Survey of the colonization road, north from Teulon, across townships 16 and 17, range 2, and township 17, range 1, east of the principal meridian, and across townships 17, 18, 19 and 20, range 1, west of the principal meridian.
Bray, Edgar	Oakville, Ont.	Contract No. 11 of 1907 ; subdivision of township 37, range 2, and parts of township 37, range 1, and townships 38, ranges 1 and 3, all west of the second meridian.
Carson, P. A.	Ottawa, Ont.	Triangulation surveys in British Columbia in connection with the Trigonometrical Section of the Topographical Survey of Canada.
Cantley, R. H.	Edmonton, Alta.	Contract No. 23 of 1907 ; subdivision of townships 33 and 34, ranges 14, 15, 16, 17, 18, 19 and 20, west of the fourth meridian.
Cantley, R. W.	Edmonton, Alta.	Contract No. 28 of 1907 ; subdivision of townships 41, ranges 15, 16 and 17, and townships 42, ranges 10, 11 and 16, all west of the second meridian.
Chilver, C. A.	Glen Lyon, Man.	Contract No. 6 of 1907 ; subdivision of townships 37, ranges 5 and 6, townships 38, ranges 4, 5, 6, 10 and 11 ; survey of the east outlines of townships 37 and 38, range 7, townships 39, ranges 5, 6, 7 and 10, and of townships 40, ranges 5, 6 and 7, all west of the second meridian.

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APPENDIX No. 1.

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1907, to March 31, 1908.—*Continued.*

Surveyor.	Address.	Description of Work.
Christie, W.	Chealey, Ont.	Survey of the eighth base line across ranges 1, 2, 3, 4, 5, 11, 12, 13, 14 and part of 10; the ninth base line across ranges 10, 11, 12, 13, 14, 15, 16, 17, 18 and part of 19, all west of the principal meridian; survey of the principal meridian across townships 26, 27 and 28.
Côté, J. L.	Edmonton, Alta.	Contract No. 9 of 1907; subdivision of townships 65 and 66, ranges 19, 20, 21 and 23, township 66, range 22, north of Athabaska river; survey of the east outlines of townships 67 and 68, ranges 19, 20, 21, 22 and 23, all west of the fourth meridian.
Davies, T. A.	Ottawa, Ont.	Retracement and restoration survey in townships 51, 52, 53 and part of 50, range 26, west of the third meridian; township 41, range 16; townships 41, 42 and 43, range 17; townships 43 and 44, range 18, and township 44, range 19, west of the fourth meridian; correction survey in township 50, range 2; township 52, range 8; township 44, range 17; township 45, range 18, and township 43, range 20, west of the fourth meridian; part subdivision of township 52, range 22, west of the third meridian.
Deans, W. J.	Brandon, Man.	Retracement and restoration survey of township 24, range 30, west of the principal meridian, and township 21, range 1, west of the second meridian; traverse of Whitesand river from the second meridian to the Assiniboine river and of lakes in township 24, range 2, township 32, range 9, and township 34, range 3, west of the second meridian; correction survey in township 14, range 7, west of the second meridian; survey of Doukhobor villages in townships 30, ranges 1 and 5, township 31, range 3, and townships 31 and 32, range 6, west of the second meridian; survey of townships 29 and 30, between Whitesand and Assiniboine rivers and of the south and east boundaries of Côté Indian reserve.
Dumais, P. T. C.	Hull, Que.	Contract No. 33 of 1907; resurvey of parts of township 18, range 20, and township 20, range 22, west of the principal meridian.
Edwards, Geo.	Ponoka, Alta.	Contract No. 19 of 1907. Subdivision of townships 27, 28, 29 and 30, ranges 14, 15 and 16, and parts of townships 27, ranges 17 and 18, all west of the fourth meridian.
Fairchild, C. C.	Brantford, Ont.	Contract No. 8 of 1907. Subdivision of townships 29, 30, 31 and 32, ranges 18, 19 and 20, and townships 29, 30 and 31, range 21, all west of the fourth meridian.
Fawcett, Adam	Gravenhurst, Ont.	Contract No. 30 of 1907. Subdivision of townships 27, 28, 29, 30 and 31, range 14, part of township 31, range 15, and part resurvey of township 30, range 15, all west of the principal meridian.
Fontaine, L. E.	Levis, Que.	Traverse of Milk river through Canadian territory. Survey of part of township 4, range 6, west of the fourth meridian.
Green, W. T.	Ottawa, Ont.	Miscellaneous surveys in townships 13 and 15, range 1; townships 14, ranges 1 and 2; townships 20 and 22, range 4 and township 21, range 5; traverses of Bow and Cascade rivers, of the Canadian Pacific railway canal in township 25, range 11, and of Highwood river in township 18, range 1, all west of the fifth meridian; traverse of Little Bow river in township 13, range 24, west of the fourth meridian; resurvey of Brewster Leasehold in the Rocky Mountains Park.

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APPENDIX No. 1.

SCHEDULE of Surveyors employed and work executed by them, from April 1, 1907, to March 31, 1908.—*Continued.*

Surveyor.	Address.	Description of Work.
Grover, G. A.....	Norwood, Ont.....	Contract No. 27 of 1907. Subdivision of townships 42 and 43, range 9; townships 40 and 43, range 10 and townships 39, 40 and 43, range 11; survey of the east outlines of townships 42 and 44, range 10 and of townships 41, 42 and 44, range 11, all west of the second meridian.
Hawkins, A. H.....	Listowel, Ont.....	Survey of the thirteenth base line across ranges 13 to 23 inclusive; the twelfth base line across ranges 9 to 14 inclusive, and resurvey of twelfth base line across ranges 1 to 8 inclusive, between the fifth and sixth meridians.
Holcroft, H. S.....	Toronto, Ont.....	Contract No. 5 of 1907. Subdivision of townships 49, 50, 51 and 52, range 15, and townships 51 and 52, range 16, west of the third meridian.
Hopkins, M. W.....	Edmonton, Alta.....	Contract No. 4 of 1907. Subdivision of townships 59 and 60, ranges 1, 2, 3 and 4, and townships 59, 60, 61 and 62, ranges 5 and 6; survey of the east outlines of townships 57 and 58, ranges 2 and 3, and townships 63 and 64, ranges 6 and 7, all west of the fourth meridian.
Hubbell, E. W.....	Ottawa, Ont.....	Miscellaneous surveys in township 46, range 21; townships 44 and 46, range 22; township 46, range 23; township 27, range 24; townships 45 and 49, range 26; townships 17, 20, 21 and 22, range 29 and township 18, range 30, west of the second meridian, and in townships 33, 34 and 35, range 1, and township 34, range 2, west of the third meridian; traverse in township 25, range 25, west of the second meridian. Inspection of contracts Nos. 5, 15, 20 and 21 of 1907. Completion of inspection of contract No. 12 of 1906.
Johnson, A. W.....	Kamloops, B. C.....	Subdivision survey in township 4, range 28, and townships 2, 4, 9, 10 and 11, range 29, and resurvey in township 8, range 28 and township 4, range 29, west of the sixth meridian, and in townships 5 and 6, range 4, and in townships 4, 5 and 6, range 5, west of the seventh meridian. Traverses in townships 3 and 4, range 28, west of the sixth meridian, and in townships 5 and 6, range 4, and in townships 4, 5 and 6, range 5, west of the seventh meridian. Survey of Pitt meadows in townships 40 and 42, east of the coast meridian. Survey of part of the townsite of Yale, and correction survey of the townsite of Hope in townships 7 and 5, respectively, range 26, west of the sixth meridian.
Kimpe, M... ..	Edmonton, Alta.....	Contract No. 16 of 1907. Subdivision of township 58, range 8; townships 57 and 58, range 9; townships 58 and 59, range 10; townships 59, ranges 11 and 12, and townships 60, ranges 10, 11 and 12, south of Athabaska river. Survey of east boundaries of townships 59 and 60, range 9; township 57, range 10; townships 57 and 58, ranges 11 and 12, and townships 57, 58, 59 and 60, range 13, all west of the fifth meridian.
Kirk, J. A.....	Revelstoke, B. C.....	Subdivision in township 28, range 20, west of the fifth meridian, and township 23, range 2, west of the sixth meridian.
Knight, R. H.....	Edmonton, Alta.....	Contract No. 22 of 1907. Subdivision of township 61, range 1; townships 60 and 61, range 2, and township 61, ranges 3, 4 and 5. Survey of the east boundary of township 61, range 6, all west of the fifth meridian.

APPENDIX No. 1.

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1907, to March 31, 1908.—Continued.

Surveyor.	Address.	Description of Work.
Loneragan, G. J.....	Buckingham, Que.....	Inspection of part of contract No. 15 of 1905, contracts No. 24 of 1906, and Nos. 4, 8, 9, 10, 18, 19 and 23 of 1907. Traverse in township 36, range 19 west of the fourth meridian. Miscellaneous resurveys in township 57, range 10; township 59, range 12; township 26, range 17; township 52, range 21; and townships 51, ranges 25 and 26; part subdivision of township 27, range 17, and township 51, range 21, all west of the fourth meridian.
Magrath, C. A.....	Lethbridge, Alta.....	Contract No. 18 of 1907. Subdivision of townships 7 and 8, range 12, and township 8, range 13, all west of the fourth meridian.
Miles, C. F.....	Toronto, Ont.....	Inspection of contracts Nos. 17, 25 and 41 of 1907, and parts of contracts Nos. 10, 13 and 25 of 1906. Survey of the townsites of Ernfold and Chaplin in township 17, range 7, and township 17, range 5, respectively, west of the third meridian. Correction survey in township 6, range 14, west of the second meridian. Retracement surveys in township 23, range 26, west of the second meridian. And in townships 21 and 24, range 1, township 24 and part of township 23, range 2, west of the third meridian.
Molloy, John.....	Winnipeg, Man.....	Contract No. 32 of 1907. Subdivision of township 8, range 14; townships 1, 2, 3, 4, 5, 6, 7 and 8, range 15, all east of the principal meridian.
Montgomery, R. H....	Prince Albert, Sask..	Contract No. 13 of 1907. Subdivision of townships 50, ranges 15, 16 and 17, north of the Saskatchewan river; townships 50, ranges 18, 19, 20 and 21; townships 51, ranges 19, 20 and 21; north one-third of township 49, range 19. Survey of the east outlines of townships 51 and 52, ranges 15, 16, 17 and 18, and townships 52, ranges 19, 20 and 21, all west of the second meridian.
McLennan, A. L.....	Toronto, Ont.....	Contract No. 20 of 1907. Subdivision of townships 51, ranges 24 and 25; townships 52, ranges 23, 24, 25, 26 and 27, west of the second meridian; and townships 52, ranges 1 and 2, west of the third meridian.
McFarlane, W. G.....	Toronto, Ont.....	Contract No. 1 of 1907. Subdivision of townships 42 and 43, range 12; the south one-third of townships 45, ranges 1, 2, 3, 4, 5, 6 and 7, and the south two-thirds of townships 45, ranges 8, 9, 10 and 11. Survey of the east outline of township 41, range 12, and miscellaneous subdivision in township 44, range 1, and township 45, range 12, all west of the second meridian. Subdivision of the west half of township 41, range 25; the east half of townships 41 and 43, range 26; the north one-third of townships 44, ranges 28, 29, 30 and 31; miscellaneous subdivision in townships 42, ranges 25 and 26; townships 44, ranges 26, 27 and 32, and in township 45, range 32, all west of the principal meridian.
McGrandle, H.....	Wetaskiwin, Alta.	Contract No. 10 of 1907. Subdivision of township 60, range 23; townships 66, 67 and 68, range 24. Survey of the east outline of townships 65, 66, 67 and 68, range 25, all west of the fourth meridian.
McMillan, Geo.....	Ottawa, Ont.....	Inspection of contracts Nos. 2, 9 and 27 of 1906, and contracts Nos. 3 and 12 of 1907. Resurvey of river lots in township 18, range 10, east of the principal meridian. Completion of the survey of the townsite of Gimli. Retracement and restoration survey of Manitoba House settlement in township 22, range 11, and in township 21, range 10, west of the principal meridian.

SESSIONAL PAPER No. 25b

APPENDIX No. 1.

SCHEDULE of Surveyors employed and work executed by them, from April 1, 1907, to March 31, 1908.—*Continued.*

Surveyor.	Address.	Description of Work.
O'Hara, W. F.....	Ottawa, Ont.....	Survey of the second base line across ranges 2, 3 and part of 4. Subdivision of part of township 5, range 2, and parts of townships 5 and 6, range 3, all west of the fifth meridian.
Ord, L. R.....	Winnipeg, Man.....	Contract No. 34 of 1907. Subdivision of townships 64, ranges 21, 22, 23 and 24, and survey of the east outline of township 64, range 25, west of the fourth meridian.
Parsons, J. L. R.....	Toronto, Ont.	Contract No. 17 of 1907. Subdivision of townships 1 and 2, ranges 17 and 18; townships 4, ranges 23 and 24; townships 9, ranges 25, 26 and 27; township 6, range 29, and townships 4, 5 and 6, range 30. Survey of the east outlines of townships 1 and 2, range 19, all west of the second meridian. Subdivision of townships 4, 5 and 6, range 1; townships 4, 5, 7, 8, 9, 10, 11 and 12, range 2; townships 5, 11 and 12, range 3; townships 12, ranges 4 and 5; townships 11 and 12, ranges 6, 7, 8, 9 and 10; survey of the east boundaries of townships 6, 7 and 8, range 3, all west of the third meridian.
Pearce, W.....	Calgary, Alta.....	Resurvey of township 24, range 22, and the east boundaries of sections 27 and 34, township 27, range 27, west of the fourth meridian.
Ponton, A. W.....	Macleod, Alta.....	Survey of the fifth meridian from the twentieth base to the twenty-second base; subdivision in township 10, range 29, west of the fourth meridian.
Reilly, W. R.....	Regina, Sask.....	Subdivision of townships 54, ranges 27 and 28. Retracement of township 34, range 6; part of township 38, range 13, and townships 51, 52 and 53, range 27, west of the third meridian. Mounding in townships 41 and 42, range 27, west of the second meridian. Traverse of two lakes, one in township 20, range 22, west of third meridian, and one in township 52, range 1, west of the fourth meridian.
Ross, Geo.....	Welland, Ont.....	Survey of the fourteenth base line across ranges 13 to 28, inclusive, west of the fifth meridian.
Ross, Jos. E.....	Kamloops, B.C.....	Traverse of the Columbia river through townships 30 and 31, range 25; townships 31 and 32, range 26, and township 32, range 27, west of the fifth meridian. Subdivision in townships 19, ranges 6 and 7; townships 18, ranges 7 and 8; townships 17, 18 and 19, range 9; townships 17, 18, 19 and 20, range 10; townships 17 and 18, range 11; township 18, range 12; townships 17, 18 and 19, range 14. Resurvey in townships 19, ranges 15 and 17, and townships 19 and 20, range 18, all west of the sixth meridian. Traverse in township 19, range 6; townships 18 and 19, ranges 7 and 9; townships 17, ranges 10, 12 and 13; townships 17 and 18, range 14; township 19, range 15, and township 20, range 18, all west of the sixth meridian.
Roy, G. J. P.....	Quebec, Que.....	Contract No. 21 of 1907. Subdivision of township 47, range 11; townships 49, ranges 12 and 13; townships 49, 50 and 51, range 14. Survey of the east outline of township 52, range 14, all west of the third meridian.
Saint Cyr, A.....	Ottawa, Ont.....	Survey of the sixth meridian from the sixteenth base line to the fourteenth base line; East outline of townships 51 and 52, range 27, west of the fifth meridian; and traverse from the southeast corner of township 51, range 27, west of the fifth meridian, to the northeast corner of township 48, range 1, west of the sixth meridian.

8-9 EDWARD VII., A. 1909

APPENDIX No. 1.

SCHEDULE of Surveyors employed, and work executed by them, from April 1, 1907, to March 31, 1908.—*Continued.*

Surveyor.	Address.	Description of Work.
Saint Cyr, J. B.....	Montreal, Que.....	Subdivision of township 78, range 3; part of township 80, range 4, and parts of townships 71 and 72, range 6; survey of east outlines of townships 77, 79 and 80, ranges 3 and 4; township 78, range 4; township 80, range 5, and township 72, range 7, all west of the sixth meridian. Survey of Flyingshot Lake settlement, Spirit River settlement, and Peace River settlement, situated respectively in township 71, range 6, townships 78, ranges 5 and 6, west of the sixth meridian, and township 84, range 21, west of the fifth meridian.
Saunders, B. J.....	Edmonton, Alta.....	Survey of the meridian between ranges 8 and 9 across townships 19A, 19, 20, 21, 22, 23, 24, 25 and 26; the fourth base line across ranges 16 and 17, and part of 15; the sixth and seventh base lines across ranges 8 and 9, all east of the principal meridian.
Selby, H. W.....	Toronto, Ont.....	Subdivision of townships 74 and 75, ranges 14 and 15, and parts of townships 77, ranges 15 and 16. Survey of the east outlines of townships 73, ranges 14 and 15, all west of the fifth meridian.
Smith, C. C.....	Brampton, Ont.....	Subdivision survey in township 10 range 29 west of the fourth meridian; also part survey of townships 10 and 11 ranges 2 and 3, and subdivision in townships 7 and 9 ranges 5 and 6 west of the fifth meridian; survey of the townsite of Grassy Lake in township 10 range 13, west of the fourth meridian.
Stacey, A. G.....	Ottawa, Ont.....	Miscellaneous surveys in townships 20 ranges 18 and 19, townships 19, 20 and 21 range 20, townships 19 and 21 range 21, townships 16, 19 and 20 range 22, townships 15, 16, 20 and 21 range 23, township 20 range 24, townships 17, 22 and 23 range 25 and townships 20, 21 and 22 range 26, all west of the sixth meridian; traverse in townships 20 ranges 18 and 19, township 21 range 20, townships 19 and 21 range 21, township 20 range 22, townships 15, 20 and 21 range 23 and townships 22 and 23 range 25, all west of the sixth meridian.
Stewart, P. G.....	Britannia Bay, Ont.....	Exploration survey of townships 52 ranges 7 to 16 inclusive, townships 53 ranges 13 to 16, townships 54 ranges 11 to 15, townships 55 ranges 11 to 14, and townships 56 ranges 11 to 13, all west of the fifth meridian.
Tensdale, C. M.....	Concord, Ont.....	Contract No. 41 of 1907; partial subdivision of township 10 range 4, and subdivision of township 11 range 4, and townships 10 and 11 range 5, all west of the third meridian. Contract No. 26 of 1907; subdivision of townships 25 and 26 ranges 8 and 9, all west of the principal meridian.
Thibaudan, W.....	Ottawa, Ont.....	Preliminary investigation of the water-powers on the Winnipeg river, between lake Winnipeg and the eastern boundary of Manitoba.
Tyrrell, J. W.....	Hamilton, Ont.....	Contract No. 14 of 1907; subdivision of township 24 range 1, townships 24 and 25 ranges 2 and 3, and township 25 range 4; survey of the east outline of township 25 range 1, and resurvey of the north outline of township 24 range 4, all east of the principal meridian; subdivision of townships 24 ranges 1, 2, 3 and 5, all west of the principal meridian.
Waldron, J.....	Moosejaw, Sask.....	Contract No. 25 of 1907; subdivision of townships 8 ranges 16, 17, 18, 19 and 20, also part of township 8 range 21, west of the third meridian.
Wallace, J. N.....	Calgary, Alta.....	Survey of the boundary between British Columbia and the Yukon Territory between Stations 'M' and 'N' across the Dalton trail.

SESSIONAL PAPER No. 25b

APPENDIX No. 1.

SCHEDULE of Dominion Land Surveyors employed, and work executed by them, from April 1, 1907, to March 31, 1908.—*Continued.*

Surveyor.	Address.	Description of Work.
Warren, Jas.....	Walkerton, Ont.....	Contract No. 15 of 1907 ; subdivision of township 51 range 3, townships 50 and 51 range 4, township 48 range 6 and townships 48 and 49 range 7, and the east outline of township 49 range 8, all west of the third meridian.
Watt, G. H.....	Ottawa, Ont.....	Contract No. 12 of 1907 ; completion of subdivision of township 16 range 12, townships 13 and 14 range 13 ; subdivision of townships 15, 16 and 17 range 13, townships 13 and 14 range 14 ; survey of the south outline of township 15 range 14, all east of the principal meridian.
Wheeler, A. O.....	Calgary, Alta....	Topographer of the Department of the Interior. Phototopographical survey of the railway belt west of Golden, British Columbia, in the Dogtooth and Selkirk mountains.

8-9 EDWARD VII., A. 1909

APPENDIX NO. 2.

SCHEDULE showing for each Surveyor employed from April 1, 1907, to March 31, 1908,
the number of miles surveyed of township section lines, township outlines, traver-
ses of lakes and rivers, and  of the same.



* Inspecting contract surveys a portion of the season.

SESSIONAL PAPER No. 25b

APPENDIX No. 3.

List of lots in the Yukon Territory surveys of which have been received from
April 1, 1907, to March 31, 1908.

GROUP No. 1.

Lot No.	Area in Acres.	Surveyor.	Year of Survey.	Date of Approval.	Claimant.	Remarks.
40	1.00	C. S. W. Barwell	1907..	Oct. 11, 1907..	D. A. McRea <i>et al.</i>	Surface.

GROUP No. 2.

345	40.00	T. D. Green....	1907..	May 29, 1907..	Chris. H. Authier.....	Surface.
346	1.29	"	1907..	" 29, 1907..	" "	"
352	91.14	C. W. MacPherson.....	1907..	Oct. 11, 1907..	H. H. Norwood Co.....	"
353	94.25	"	1907..	" 11, 1907..	" "	"
354	114.74	"	1907..	" 11, 1907..	" "	"
355	87.00	"	1907..	" 11, 1907..	" "	"
356	99.75	"	1907..	" 11, 1907..	" "	"
359	51.6	C. S. W. Barwell	1907..	" 7, 1907..	Wm. Elliott <i>et al.</i>	Mineral claim.
360	38.9	"	1907..	" 7, 1907..	"	"
361	37.1	"	1907..	" 7, 1907..	"	"
362	47.4	"	1907..	" 7, 1907..	"	"
367	29.9	"	1907..	" 7, 1907..	"	"
368	51.6	"	1907..	" 7, 1907..	"	"
369	51.6	"	1907..	" 7, 1907..	"	"
370	51.6	"	1907..	" 7, 1907..	"	"
371	51.6	"	1907..	" 7, 1907..	"	"
372	51.6	"	1907..	" 7, 1907..	"	"
373	51.6	"	1907..	" 7, 1907..	"	"
374	51.6	"	1907..	" 7, 1907..	"	"
383	11.47	C. W. MacPherson.....	1907..	" 30, 1907..	O. R. Brenner.....	Surface.
384	11.47	"	1907..	" 30, 1907..	"	"
385	11.47	"	1907..	" 30, 1907..	"	"
386	11.47	"	1907..	" 30, 1907..	"	"
388	.....	C. S. W. Barwell	1904..	*	{ White channel Gold..... { Hill Hyd'c. Co. Ltd.....	"

GROUP No. 5.

66	32.36	H. G. Dickson..	1905..	June 22, 1907..	J. P. Whitney <i>et al.</i>	Mineral claim.
67	26.93	"	1905..	" 22, 1907..	"	"
68	51.39	"	1905..	" 22, 1907..	"	"
69	50.10	"	1905..	" 22, 1907..	"	"
71	42.88	"	1907..	Oct. 21, 1907..	"	"
72	40.34	"	1907..	" 21, 1907..	"	"
73	48.17	"	1907..	" 21, 1907..	"	"
74	31.73	"	1907..	" 21, 1907..	"	"
75	42.35	"	1907..	" 21, 1907..	"	"
76	24.60	"	1907..	" 21, 1907..	"	"
77	25.46	"	1907..	" 21, 1907..	"	"
78	49.95	"	1906..	June 22, 1907..	Bryson N. White.....	"
79	40.08	"	1906..	" 22, 1907..	"	"
80	50.82	"	1906..	" 22, 1907..	"	"
81	17.82	"	1906..	" 22, 1907..	"	"
82	51.65	"	1906..	" 22, 1907..	"	"
83	51.65	"	1906..	" 22, 1907..	"	"
84	49.06	"	1907..	*	C. H. Johnston <i>et al.</i>	"
85	44.80	"	1907..	*	"	"
86	49.16	"	1907..	*	"	"
87	49.15	"	1907..	*	"	"

* Not yet approved.

APPENDIX No. 3.

List of Lots in the Yukon Territory surveys of which have been received from April 1, 1907, to March 31, 1908.—*Concluded.*

Lot No.	Area in Acres.	Surveyor.	Year of Survey.	Date of Approval.	Claimant.	Remarks.
88	51.02	" ..	1907..	Jan. 23, 1908..	A. C. Robertson <i>et al.</i>	Mineral Claim.
89	51.62	" ..	1907..	" 23, 1908..	"	"
90	18.03	" ..	1907..	" 23, 1908..	"	"
91	45.72	" ..	1907..	" 23, 1908..	"	"
92	51.65	" ..	1907..	" ..	J. Williams & A. La Rose....	"
93	51.65	" ..	1907..	" ..	" ..	"
94	51.65	" ..	1907..	Jan. 23, 1908..	" ..	"
95	51.54	" ..	1907..	" 23, 1908..	" ..	"
96	49.84	" ..	1907..	" 23, 1908..	J. P. Whitney.....	"
97	27.17	" ..	1907..	Feb. 26, 1908..	W. S. Thomas.....	"
98	122.42	" ..	1907..	" ..	J. Williams & A. La Rose....	"
99	145.01	" ..	1907..	" ..	" ..	"
100	144.35	" ..	1907..	" ..	" ..	"
101	150.03	" ..	1907..	" ..	" ..	"
102	158.35	" ..	1907..	" ..	" ..	"
103	32.80	" ..	1907..	Feb. 26, 1908..	W. S. Thomas.....	"
104	24.63	" ..	1907..	Jan. 23, 1908..	Clara L. Walters....	"
105	44.05	" ..	1907..	" 22, 1908..	B. J. McGee.....	"
106	46.62	" ..	1907..	" 22, 1908..	W. J. Elmendorf.....	"
107	11.78	" ..	1907..	" 22, 1908..	" ..	"
108	51.65	" ..	1907..	" 23, 1908..	C. P. Seale.....	"
109	28.55	" ..	1907..	" 22, 1908..	Florence Young.....	"
142	33.61	N. A. Burwash..	1908..	" ..	A. B. Palmer.....	"

GROUP No. 6.

23	51.65	H. G. Dickson..	1907..	*	R. H. Chadwick.....	Mineral claim.
80	36.55	" ..	1907..	"	"	"

GROUP No. 10.

22	10.00	C. S. W. Barwell	1907..	Sept. 13, 1907..	S. Rowlinson.....	Surface.
23	160.00	" ..	1907..	" 13, 1907..	C. E. Miller <i>et al.</i>	"
24	160.00	" ..	1907..	" 13, 1907..	" ..	"
25	40.00	" ..	1907..	" 13, 1907..	Geo. Delion.....	"
26	120.00	" ..	1907..	Oct. 11, 1907..	A. B. Palmer.....	"

* Not yet approved.

APPENDIX No. 4.

List of Miscellaneous surveys in the Yukon Territory, returns of which have been received from April 1, 1907, to March 31, 1908.

Year.	Surveyor.	Description of Survey.
1907	T. D. Green....	Base Line on Dago Gulch, a tributary of Hunker creek.
1907	H. G. Dickson..	" Burwash creek, a tributary of Kluane river.

APPENDIX No. 5.

STATEMENT of work executed in the office of the chief draughtsman.

Letters of instruction to surveyors..	177
Progress sketches received and filed..	1,002
Declarations of settlers received and filed..	473
Plans received from surveyors..	334
Field books received from surveyors..	577
Timber reports received..	56
Preliminary township plans prepared..	369
Sketches made..	1,352
Maps made..	22
Tracings and miscellaneous plans made..	154
Plans of Yukon lots received..	76
Plans of miscellaneous Yukon surveys received..	2
Tracings of Yukon survey plans made..	87
Yukon lots reduced to 40 chains to 1 inch and plotted on group plans..	96
Yukon traverses reduced to 40 chains to 1 inch and plotted on group plans..	2
Returns of surveys examined—	
Township subdivision..	362
Township outline..	157
Road plans..	233
Railway plans..	112
Mineral claims..	32
Timber berths..	60
Correction and other miscellaneous surveys..	55
Township plans compiled..	604
Proofs of plans examined..	539
Township plans printed..	518
Townsites and settlements printed..	5
Descriptions written..	7
Pages of field notes copied..	244
Traverse reductions made..	28
Applications for various information dealt with..	1,869
Fyles received and returned..	1,980
Letters drafted..	4,993
Books received from record office and used in connection with office work..	4,870
Books returned to record office..	5,254
Plans other than township plans received from record office and used in connection with office work..	552
Plans returned to record office..	572
Volumes of plans received from record office and used in connection with office work..	78
Volumes of plans returned to record office..	74
Books sent to record office to be placed on record..	494
Plans other than township plans sent to record office to be placed on record..	476

SESSIONAL PAPER No. 25b

APPENDIX No. 5—Continued.

Sectional maps (3 miles to 1 inch)—	
Revised.. . . .	73
Reprinted.. . . .	28
New sheets compiled.. . . .	6
New sheets printed.. . . .	4
New drawings of old worn out sheets.. . . .	2
New tracings of old worn out sheets.. . . .	7
Sectional maps (6 miles to 1 inch)—	
Reprinted.. . . .	24
New sheets printed.. . . .	3
Proofs of sectional sheets examined.. . . .	110

APPENDIX No. 6.

List of new editions of sectional maps issued from April 1, 1907, to March 31, 1908.
Scale 3 miles to an inch.

No.	Name.	No.	Name.	No.	Name.	No.	Name.
10	Port Moody	67	Maple Creek	215	Red Deer.	269	Pr. Albert S.
11	Yale.....	68	Swift Current.....	216	Sullivan Lake.....	*313	Brulé.
15	Lethbridge.....	111	Kamloops.....	*263	Jasper.....	314	St. Ann.
16	Milk River.....	164	Morley.....	264	Brazeau.....	319	Pr. Albert N.
17	Cypress.....	165	Rosebud.	265	Peace Hills.....	*320	Carrot River.
19	Willowbunch.....	168	The Elbow.....	266	Ribstone Creek.....	365	Victoria.
61	Lytton.....	171	Duck Mountain.....	267	Battleford.....	366	Saddle Lake.
66	Medicine Hat.....	172	Fairford.....	268	Carlton.....	*416	La Biche.

SCALE 6 MILES TO AN INCH.

10	Port Moody	66	Medicine Hat.....	111	Kamloops.....	314	St. Ann.
11	Yale.....	67	Maple Creek.....	165	Rosebud	317	Fort Pitt.
15	Lethbridge.....	68	Swift Current.....	171	Duck Mountain.....	318	Shell River.
16	Milk River.....	69	Moosejaw.....	172	Fairford.....	319	Pr. Albert N.
17	Cypress.....	71	Brandon.	*263	Jasper.....	*320	Carrot River.
19	Willowbunch.....	72	Portage La Prairie..	268	Carlton.....	365	Victoria.
61	Lytton.....			269	Prince Albert S.....		
				*313	Brulé.....		

* First edition.

APPENDIX No. 7

STATEMENT of work executed in the Survey Records Office from April 1, 1907,
to March 31, 1908.

Files received and dealt with.. . . .	10,466
Letters drafted.. . . .	4,405
Plans, tracings, &c., copied or compiled.. . . .	869
Statutory declarations copied or mailed.. . . .	506
Plans sent to agents, registrars, &c...	28,545
Pages of field notes copied.. . . .	2,348
Prints of plans received and stored.. . . .	110,785
Original plans received and recorded.. . . .	1,068
Original field notes received and recorded.. . . .	438
Letters written to agents	1,300
Registered parcels mailed.. . . .	1,741

Work done for Topographical Surveys Branch.

Books searched for.. . . .	8,018
Books sent.. . . .	5,396
Books returned	6,250
Plans searched for...	2,223
Plans sent.. . . .	1,820
Plans returned.. . . .	532
Volumes searched for	184
Volumes sent.. . . .	77
Volumes returned.. . . .	75

Work done for Patents Branch.

Plans searched for.. . . .	812
Plans sent	1,427
Plans returned	924
Field notes searched for	226
Field books sent.. . . .	57
Field books returned.. . . .	63

Work done for other Branches.

Plans searched for.. . . .	1,453
Plans sent.. . . .	1,427
Plans returned.. . . .	924
Field notes searched for.. . . .	266
Field notes sent.. . . .	240
Field notes returned.. . . .	244

APPENDIX No. 8.

STATEMENT of work executed in the Photographic Office from April 1, 1907, to March 31, 1908.

FOR THE DEPARTMENT OF THE INTERIOR.

—	3½ x 3½	4 x 5	5 x 7	8 x 10	10 x 12	11 x 14	16 x 18	18 x 20	24 x 30	30 x 36	36 x 42	42 x 48	Total.
Bromide prints.....		183	435	38	27	758	38	82	36	34	18	8	1,607
Vandyke prints.....				2	4	17	39	51	49	7	15	12	196
Silver prints....		583	2,673	2									3,258
Lantern transparencies.....	86												86
Dry plate negatives.....		234	732										966
Wet plate negatives.....				89		91	703	185					1,068
Zinc transfers..						5		814					819
Total....	86	950	3,840	131	31	871	780	1,132	85	41	33	20	8,000

FOR THE GEOLOGICAL SURVEY.

—	3½ x 3½	4 x 5	5 x 7	8 x 10	10 x 12	11 x 14	16 x 18	18 x 20	24 x 30	30 x 36	36 x 42	42 x 48	Total.
Bromide prints.....				4		33							37
Silver prints....		52											52
Total....		52		4		33							89

APPENDIX No. 9.

STATEMENT of work executed in the Lithographic Office from April 1, 1907, to March 31, 1908.

Month.	MAPS.		TOWNSHIPS.		FORMS.	
	No. of Jobs.	No. of Copies.	No. of Jobs.	No. of Copies.	No. of Jobs.	No. of Copies.
1907.						
April.....	6	12,400	50	10,000	6	3,450
May.....	9	8,500	40	8,000	8	9,000
June.....	4	925	39	7,800	5	2,025
July.....	19	40,650	32	6,400	5	12,550
August.....	2	650	58	11,600	4	1,600
September...	6	2,050	23	4,600	3	350
October.....			63	12,600	12	9,490
November.....	14	2,175	42	8,400	6	2,825
December.....	8	3,025	45	9,000	3	600
1908.						
January.....	10	7,550	50	10,000	10	3,525
February.....	10	3,000	53	10,600	14	6,750
March.....	1	350	78	15,600	12	6,890
Total.....	89	81,275	573	114,600	88	59,055

Summary of work for the year.

	No. of Jobs.	No. of Copies.	No. of Impressions.	Cost.	Cost per map or form.
				\$ cts.	\$ cts.
Maps.....	89	81,275	185,035	2,363 63	26 55
Townships.....	573	114,600	250,820	4,361 57	7 60
Forms, &c.....	88	59,055	63,555	1,270 80	14 45
Total.	750	254,930	499,410	7,996 00	

APPENDIX No. 10.

Names and duties of employees of the Topographical Surveys Branch at Ottawa.
(Metcalf street, corner of Slater street).

Deville, E., D.T.S., LL.D., Surveyor General.

CORRESPONDENCE AND ACCOUNTS.

Brady, M., secretary.

Hunter, R. H., accountant.

Wilkinson, Percy, assistant accountant.

Percival, Miss M. F., stenographer and typewriter.

Cullen, M. J., stenographer and typewriter.

Moran, J. F., stenographer and typewriter.

Lynch, F., stenographer and typewriter.

Williams, E. R., clerk.

Pegg, A., messenger.

Paquette, Albert, messenger.

OFFICE OF CHIEF DRAUGHTSMAN.

Symes, P. B., chief draughtsman.

Shanks, T., B.A.Sc., D.L.S., assistant to chief draughtsman.

First Division—Instructions and General Information

Brown, T. E., B.A., in charge of division.

Weekes, M. B., B.A.Sc., D.L.S., O.L.S.

Umbach, J. E., Grad. S.P.S., D.L.S.

Barber, H. G., Grad. S.P.S., D.L.S.

Green, W. T., B.A., D.L.S.

Rice, F. W., Grad. School of Mining.

McRae, A. D., B.A., B.Sc.

Carroll, M. J., Grad. S.P.S.

Stewart, A. G., Grad. School of Mining.

Grant, A. W., B.A.

Belleau, J. A., D.L.S.

Dodge, G. B.

Sylvain, J.

Cram, A.

Rochon, E. C.

Burkholder, E. L.

McLaughlin, M. J.

Gaudry, G. A.

Grey, G. A.

Second Division—Examination of Surveyors' Returns.

Nash, T. S., Grad. S.P.S., D.L.S., in charge of division.

Henderson, F. D., Grad. S.P.S., D.L.S.

Burgess, E. L., Grad. S.P.S., D.L.S., O.L.S.

SESSIONAL PAPER No. 25b

Dennis, E. M., B.Sc.
 Akins, J. R., B.Sc.
 Cumming, A. L., B.Sc.
 Elder, A. J., Grad. S.P.S., D.L.S.
 Hill, S. N., Grad. S.P.S.
 Elwell, W., Grad. S.P.S.
 Maynard, F.H., Grad. R.M.O.
 Day, H. S., B.Sc.
 Sutherland, H. E., B.Sc.
 Morrier, J. E., D.L.S.
 Davies, T. A., D.L.S.
 Kitto, F. H., D.L.S.
 McClennan, W. D.
 Roger, A.
 Clunn, T. H. G.
 Robertson, D. F.
 Spreckley, R. O.
 Goodday, Leonard
 Williamson, F. H. H.
 Webb, G. C.
 Wilding, C. H.
 Bray, R. P.
 Harrison, E. W.
 Ault, H. W.
 Macdonald, J. A.

Third Division—Drawing Plans for Printing.

Engler, Carl, B.A., D.L.S., in charge of division.
 May, J. E.
 O'Connell, J. R.
 Moule, W. J.
 Villeneuve, E. J.
 Helmer, J. D.
 Archambault, E.
 Tremblay, A.
 Hutton, J. B.
 Brown, A.
 Binks, C. B.
 Dawson, R. J.
 Holbrook, C. H.
 Watters, James.

Fourth Division—British Columbia Surveys.

Rowan-Legg, E. L., in charge of division.
 Carson, P. A., B.A., D.L.S.
 MacIlquham, W. L., B.Sc.
 Gillmore, E. T. B., Grad. R.M.O.
 Lawe, H., D.L.S.
 Morley, R. W.
 Weld, W. E.
 Wilson, E. D.

8-9 EDWARD VII., A. 1909

Fifth Division—Imperial building, Queen street—Mapping.

Smith, Jacob, in charge of division.

Bégin, P. A.

Lepage, J. B.

Blanchet, A. E.

Davies, T. E. S.

Taggart, C. H.

Perrin, V.

Genest, P. F. X.

Bergin, W.

Davy, Eugene.

OFFICE OF THE GEOGRAPHER.

(Woods building, Slater street.)

White, J., geographer.

Baine, H. E.

Chalifour, J. E.

Dumouchel, G. E.

Taché, H.

Darrach, M.

Wilson, H. W.

Akerlindh, A.

Anderson, W.

Blatchley, H. M.

Bennie, J.

Wood, C. G.

Craig, R. W.

Chandler, S.

Groulx, A.

Gagnon, A. S.

Inkster, F. B.

Blue, W.

Beveridge, James.

MacElligot, J. P.

Martin, Miss M. Perley.

Pigeon, Jules.

Waine, Mrs. D. E.

Merrifield, J. R.

SURVEY RECORDS OFFICE.

(Canadian building, Slater street.)

Steers, C. J., clerk in charge.

Currie, P. W., B.A., B.Sc., D.L.S., assistant clerk in charge.

Surtees, W. S., draughtsman.

Sowter, T. W. E., draughtsman.

Smith, F. W., draughtsman.

Routh, C. F., draughtsman.

Ashton, A. W., draughtsman.

Lecourt, Eugène, draughtsman.

Moore, R. T., draughtsman.

Lambart, O. H., draughtsman and typewriter.

Belleau, Eugène, draughtsman.

SESSIONAL PAPER No. 25b

Yeilding, Miss A., typewriter.
Mudie, J. M., draughtsman.
Gillis, W. O., draughtsman.
Landry, Narcisse, messenger.

LITHOGRAPHIC OFFICE.

(Metcalf street, corner of Slater street.)

Moody, A., foreman.
Thicke, C., engraver and lithographer.
Thicke, H., power press printer.
Bergin, J., power press printer.
Deslauriers, J. H., transferrer.
Boyle, S., stone polisher.
Gagnon, J., press feeder.

PHOTOGRAPHIC OFFICE.

(Metcalf street, corner of Slater street.)

Topley, H. N., photographer in charge.
Carruthers, H. K., photo-lithographer and photo-engraver.
Woodruff, J., photographer.
Whitcomb, H. E., photographer.
Morgan, W. E., photographer.
Kilmartin, A., photographer.
Devlin, A., photographer.
Ouimet, Geo., photographer.

GEOGRAPHIC BOARD.

(Woods building, Slater street.)

Whitcher, A. H., D.L.S., secretary.

APPENDIX No. 11.

List of Dominion Land Surveyors who have been supplied with Standard Measures.

Name.	Address.	Date of Appointment.		Remarks.
Austin, G. F.	Dewdney, Alta.	April	14, 1872	Inspector of Surveys, Topographical Surveys Branch, Dept. of Interior.
Aylen, J.	Aylmer, Que.	May,	29, 1885	
Aylsworth, C. F.	Madoc, Ont.	"	17, 1886	
Baker, J. C.	Vermilion, Alta.	"	18, 1906	
Barwell, C. S. W.	Dawson, Yukon Territory	Aug.	21, 1894	
Bayne, G. A.	Winnipeg, Man.	April	14, 1872	
Beatty, D.	Parry Sound, Ont.	"	14, 1872	
Beatty, W.	Delta, Ont.	"	14, 1872	
Belanger, P. R. A.	Ottawa, Ont.	May	17, 1880	
Belleau, J. A.	"	"	15, 1883	Topographical Surveys Branch, Dept. of Interior.
Bigger, C. A.	"	Mar.	30, 1882	Astronomer, Dept. of Interior.
Bolton, L.	Listowell, Ont.	April	14, 1872	Dept. of Indian Affairs.
Boswell, E. J.	Winnipeg, Man.	Feb.	18, 1903	
Bourgeault, A.	St. Jean Port Joli, Que.	Mar.	29, 1883	
Bourgault, C. E.	"	Feb.	21, 1888	
Bourget, C. A.	Levis, Que.	May	14, 1884	
Bowman, H. J.	Berlin, Ont.	Feb.	16, 1888	
Brabazon, A. J.	Ottawa, Ont.	May	12, 1882	
Brady, J.	Golden, B.C.	April	14, 1872	
Bray, S.	Ottawa, Ont.	Nov.	14, 1883	
Bray, E.	Oakville, Ont.	April	14, 1872	Topog. Surveys Branch, Dept. of Interior.
Bray, L. T.	Amherstburg, Ont.	Feb.	18, 1903	
Bridgland, M. P.	Calgary, Alta.	Mar.	10, 1905	
Brownlee, J. H.	Victoria, B.C.	Apr.	15, 1887	
Burke, W.	Minnedosa, Manitoba.	"	14, 1872	
Burnet, H.	Victoria, B.C.	June	22, 1885	
Burwash, N. A.	Whitehorse, Yukon Territory ..	Mar.	6, 1907	
Burwell, H. M.	Vancouver, B.C.	Feb.	17, 1887	
Carbert, J. A.	Medicine Hat, Alta.	May	12, 1880	
Carpenter, H. S.	Regina, Sask.	Feb.	20, 1901	Dept. of Public Works for Saskatchewan.
Carroll, C.	Prince Albert, Sask.	April	14, 1872	Topog. Surveys Branch, Dept. of Interior.
Carson, P. A.	Ottawa, Ont.	Feb.	22, 1906	
Cautley, R. H.	Edmonton, Alta.	May	1, 1905	
Cautley, R. W.	"	Sept.	2, 1896	
Cavana, A. G.	Orillia, Ont.	Nov.	16, 1876	
Charlesworth, L. C.	Edmonton, Alta.	Feb.	27, 1903	
Chilver, C. A.	Walkerville, Ont.	"	22, 1907	
Christie, W.	Chesley, Ont.	Mar.	22, 1906	
Coates, P. C.	Golden, B.C.	Apr.	19, 1907	
Cleveland, E. A.	Vancouver, B.C.	June	27, 1899	Dept. of Public Works, Alberta.
Côté, J. A.	Quebec, Que.	May	14, 1884	
Côté, J. L.	Edmonton, Alta.	Mar.	21, 1890	
Cotton, A. F.	New Westminster, B.C.	May	11, 1880	
Craig, J. D.	Ottawa, Ont.	Feb.	24, 1902	
Cummings, J. G.	Calgary, Alta.	"	17, 1904	
Dalton, J. J.	Weston, Ont.	April	17, 1879	
Davies, T. A.	Ottawa, Ont.	Feb.	22, 1906	
Deans, W. J.	Brandon, Man.	May	13, 1886	Dominion Topographical Surveyor, Inspector of Irrigation and British Columbia Land Commissioner, C.P.R.
Dennis, J. S.	Calgary, Alta.	Nov.	19, 1877	

SESSIONAL PAPER No. 25b

APPENDIX No. 11.

List of Dominion Land Surveyors who have been supplied with Standard Measures.—*Continued.*

Name.	Address.	Date of Appointment.	Remarks.
Denny, H. C.	"	April 1, 1882	Dept. of Public Works for Saskatchewan.
Dickson, H. G.	Whitehorse, Yukon Territory...	May 19, 1889	
Dickson, J.	Fenelon Falls, Ont.	April 14, 1872	
Dobie, J. S.	Regina, Sask.	Mar. 22, 1906	
Doupe, J.	Winnipeg, Man.	April 14, 1872	Asst. Land Commissioner, C. P.R.
Doupe, J. L.	"	Oct. 6, 1888	
Drewry, W. S.	New Denver, B.C.	Nov. 14, 1883	Dominion Topographical Surveyor. Swamp Land Commissioner.
Driscoll, A.	Edmonton, Alta.	Feb. 23, 1887	
Drummond, T.	Montreal, Que.	June 24, 1878	
Ducker, W. A.	Winnipeg, Man.	Mar. 30, 1883	
Dumaia, P. T. C.	Hull, Que.	" 29, 1882	Dominion Topographical Surv.
Edwards, Geo.	Ponoka, Alta.	April 14, 1872	
Ellacott, C. H.	Regina, Sask.	Feb. 22, 1899	
Empey, J. M.	Calgary, Alta.	" 23, 1905	
Fairchild, C. C.	Brantford, Ont.	" 20, 1901	
Farncomb, A. E.	Red Deer, Alta.	Mar. 12, 1902	
Fawcett, T.	Niagara Falls, Ont.	Nov. 18, 1876	
Fawcett, A.	Gravenhurst, Ont.	Feb. 22, 1893	
Fontaine, L. E.	Levis, Que.	Aug. 13, 1892	
Foster, F. L.	Toronto, Ont.	April 14, 1872	
Francis, J.	Poplar Point, Man.	June 17, 1875	
Garden, J. F.	Vancouver, B. C.	May 13, 1880	
Garden, G. H.	Lethbridge, Alta.	April 14, 1872	
Garden, C.	Winnipeg, Man.	" 14, 1872	
Garner, A. C.	South Qu'Appelle, Sask.	May 27, 1907	City Surveyor, Winnipeg.
Gauvreau, L. P.	Riviere du Loup, Que.	April 14, 1872	
Gibbon, J.	Dawson, Yukon Territory	Feb. 12, 1891	
Gordon, M. L.	Vancouver, B.C.	" 18, 1904	
Gordon, R. J.	Stirling, Alta.	Mar. 12, 1902	
Gore, T. S.	Victoria, B. C.	April 19, 1879	
Green, T. D.	Dawson, Yukon Territory	May 19, 1884	
Green, W. T.	Ottawa, Ont.	Feb. 22, 1907	
Grover, G. A.	Norwood, Ont.	Feb. 18, 1904	
Harris, J. W.	Winnipeg, Man.	April 14, 1872	
Harvey, C.	Indian Head, Sask.	Feb. 17, 1904	Topographical Surveys Branch Dept. of Interior, President of D.L.S. Association.
Hawkins, A. H.	Listowel, Ont.	Mar. 6, 1906	
Heathcott, R. V.	Edmonton, Alta.	May 13, 1907	
Henderson, W.	Chilliwack, B.C.	Nov. 17, 1883	
Holcroft, H. S.	Toronto, Ont.	Feb. 18, 1903	
Hopkins, M. W.	Edmonton, Alta.	" 20, 1901	
Hubbell, E. W.	Ottawa, Ont.	May 19, 1884	
Irwin, J. M.	Kenora, Ont.	April 14, 1872	
James, S.	Toronto, Ont.	April 14, 1872	
Jephson, R. J.	Winnipeg, Man.	May 12, 1880	Dominion Topographical Surveyor, Chief Astronomer, Dept. of Interior.
Johnson, A. W.	Kamloops, B.C.	Mar. 12, 1902	
King, W. F.	Ottawa, Ont.	Nov. 21, 1876	
Kimpe, M.	Edmonton, Alta.	May 13, 1907	
Kirk, J. A.	Revelstoke, B.C.	May 11, 1880	Dominion Topographical Surveyor, Astronomer, Dept. of the Interior.
Klotz, O. J.	Ottawa, Ont.	Nov. 19, 1877	
Knight, R. H.	Edmonton, Alta.	Feb. 18, 1904	
Latimer, F. H.	Detroit, Mich.	" 13, 1885	
Laurie, R. C.	Battleford, Sask.	April 27, 1883	
Lawe, H.	Ottawa, Ont.	" 14, 1872	
Lemoine, C. E.	Quebec, Que.	Mar. 31, 1882	
Lendrum, R. W.	Strathcona, Alta.	May 15, 1880	

APPENDIX No. 11.

LIST of Dominion Land Surveyors who have been supplied with Standard Measures.—*Continued.*

Name.	Address.	Date of Appointment.	Remarks.
Lonergan, G. J.....	Buckingham, Que.....	Feb. 28, 1901	Inspector of Surveys, Topographical Surveys Branch, Dept. of Interior.
Lumsden, H. D.....	Ottawa, Ont.....	April 14, 1872	Chief Engineer Trans. Ry.
MacPherson, C. W.....	Dawson, Yukon Territory....	Mar. 7, 1900	Director of Surveys, Y.T.
Magrath, C. A.....	Lethbridge, Alta.....	Nov. 16, 1881	Dominion Topographical Surveyor, Land Commissioner, Alberta Railway and Coal Co.
Malcolm, L.....	Blenheim, Ont ..	April 14, 1872	
Meadows, W. W. . .	Maple Creek, Sask.....	Feb. 23, 1905	District Surveyor and Town Engineer.
Miles, C. F.....	Toronto, Ont.....	April 14, 1872	Inspector of Surveys, Topographical Surveys Branch, Dept. of Interior.
Moberly, H. K.....	Innisfail, Alta ..	Feb. 27, 1903	
Molloy, J.....	Winnipeg, Man.....	April 14, 1872	
Montgomery, R. H.....	Prince Albert, Sask.....	Feb. 23, 1905	
Moore, H. H.....	Calgary, Alta ..	Feb. 17, 1904	
McArthur, J. J.....	Ottawa, Ont.....	" 17, 1879	
McCull, G. B.....	Winnipeg, Man.....	Mar. 20, 1907	
McFadden, M.....	Neepawa, Man.	Feb. 14, 1872	
McFarlane, W. G.....	Toronto, Ont.....	May 19, 1905	
McFee, A.....	Innisfail, Alta ..	Feb. 19, 1879	
McGrandle, H.....	Wetaskiwin, Alta.....	May 30, 1883	
McKenna, J. J.....	Dublin, Ont.....	April 14, 1872	
McKenzie, J.....	New Westminster, B.C.	Nov. 18, 1888	Dominion Lands Agent, New Westminster.
McLean, J. K.....	Ottawa, Ont.....	April 1, 1882	Dept. of Indian Affairs.
MacLennan, A. L.....	Toronto, Ont.....	Feb. 23, 1905	
McMillan, G.....	Ottawa, Ont.....	" 22, 1906	Inspector of Surveys, Topographical Surveys Branch, Dept. of Interior.
McPherson, A. J.....	Dawson, Yukon Territory..	" 21, 1901	
McPhillips, G.....	Windsor, Ont.....	June 17, 1875	
McVittie, A. W.....	Blairmore, Alta.....	Mar. 30, 1882	
Nash, T. S.....	Ottawa, Ont.....	Feb. 18, 1904	Topographical Surveys Branch, Dept. of Interior, secretary-treasurer of the D.L.S. Assn.
Ogilvie, W.....	Ottawa, Ont.....	April 14, 1872	
O'Hara, W. F.....	Ottawa, Ont.....	Feb. 19, 1895	
Ord, L. R.....	Winnipeg, Man.....	April 1, 1882	
Parsons, J. L. R.....	Regina, Sask.....	Feb. 23, 1905	
Patrick, A. P.....	Calgary, Alta.....	Nov. 19, 1877	Dominion Topographical Surveyor.
Pearce, W.....	Calgary, Alta.....	May 10, 1880	
Phillips, E. H.....	Saskatoon, Sask.....	Feb. 24, 1902	Dept. of Public Works for Saskatchewan.
Ponton, A. W.....	Macleod, Alta.....	May 18, 1881	
Proudfoot, H. B.....	Saskatoon, Sask.....	Mar. 28, 1882	
Rainboth, E. J.....	Ottawa, Ont.....	May 19, 1881	
Rainboth, G. C.....	Aylmer, Que.....	April 14, 1872	Boundary Surveys, Dept. Interior.
Reid, J. L.....	Ottawa, Ont.....	" 14, 1872	Dept. of Indian Affairs.
Reilly, W. R.....	Regina, Sask ..	Nov. 17, 1881	
Richard, J. F.....	Ste Anne de la Pocatière, Que..	May 13, 1882	
Rinfret, E.....	Montreal, Que.....	Feb. 20, 1900	
Ritchie, J. F.....	Nelson, B.C.....	Jan. 7, 1889	
Robertson, H. H.....	Montmagny, Que.....	April 14, 1872	
Roberts, S. A.....	Victoria, B.C.....	May 16, 1885	
Roberts, V. M.....	Sturgeon Falls, Ont.....	" 17, 1886	
Robinson, F. J.....	Regina, Sask.....	Feb. 22, 1906	Dept. of Public Works for Saskatchewan.
Rombough, M. B.....	Morden, Man.....	April 14, 1872	

SESSIONAL PAPER No. 25b

APPENDIX No. 11.

LIST of Dominion Land Surveyors who have been supplied with Standard Measures.—*Concluded.*

Name.	Address.	Date of Appointment.	Remarks.
Rorka, L. V.	Toronto, Ont.	Aug. 13, 1891	
Ross, G.	Welland, Ont.	Nov. 21, 1882	
Ross, J. E.	Kamloops, B.C.	Feb. 12, 1901	
Roy, G. P.	Quebec, Que.	Nov. 17, 1881	
Saint Cyr, J. B.	Ste. Anne de la Pérade, Que.	Feb. 17, 1887	
Saint Cyr, A.	Ottawa, Ont.	" 17, 1887	
Saunders, B. J.	Edmonton, Alta.	Nov. 16, 1884	
Seager, E.	Kenora, Ont.	April 14, 1872	
Selby, H. W.	Toronto, Ont.	Nov. 15, 1882	
Seymour, H. L.	Edmonton, Alta.	Feb. 22, 1906	
Sewell, H. de Q.	Toronto, Ont.	May 16, 1885	
Shaw, C. A. E.	Victoria, B.C.	" 10, 1880	
Shepley, J. D.	Leamington, Ont.	Mar. 12, 1906	
Smith, C. C.	Brampton, Ont.	Feb. 22, 1906	
Speight, Thos.	Toronto, Ont.	Nov. 16, 1882	
Stacey, A. G.	Ottawa, Ont.	Feb. 22, 1906	
Starkey, S. M.	Starkey's P.O., N.S.	April 14, 1872	
Stewart, G. A.	Calgary, Alta.	" 14, 1872	
Stewart, L. B.	Toronto, Ont.	Nov. 22, 1882	Dominion Topographical Surveyor, Professor of Surveying, School of Practical Science.
Stewart, E.	Ottawa, Ont.	April 14, 1872	
Stewart, W. M.	Hamilton, Ont.	June 26, 1907	
Talbot, A. C.	Calgary, Alta.	May 13, 1880	
Taylor, A.	Winnipeg, Man.	June 9, 1904	
Teasdale, C. M.	Concord, Ont.	Mar. 9, 1906	
Thompson, W. T.	Fort Qu'Appelle, Sask.	Nov. 19, 1877	Dominion Topographical Surveyor.
Tracy, T. H.	Vancouver, B.C.	April 14, 1872	City Engineer, Vancouver.
Tremblay, A. J.	Les Eboulements, Que.	Feb. 18, 1890	
Towle, C. E.	Magog, Que.	April 14, 1872	
Turnbull, T.	Winnipeg, Man.	Mar. 29, 1882	
Tyrrell, J. W.	Hamilton, Ont.	Feb. 16, 1887	
Vaughan, J. W.	Vancouver, B.C.	June 11, 1878	
Vicars, J.	Kamloops, B.C.	May 17, 1886	
Waddell, W. H.	Hamilton, Ont.	Mar. 25, 1907	
Waldron, J.	Moosejaw, Sask.	April 2, 1907	
Walker, E. W.	Regina, Sask.	Mar. 27, 1907	Dept. of Public Works for Saskatchewan.
Wallace, J. N.	Calgary, Alta.	Feb. 20, 1900	
Warren, J.	Walkerton, Ont.	April 14, 1872	
Watt, G. H.	Ottawa, Ont.	Feb. 24, 1902	
Weekes, A. S.	Clinton, Ont.	" 11, 1892	
Weekes, M. B.	Ottawa, Ont.	" 18, 1903	
Wheeler, A. O.	Calgary, Alta.	Nov. 21, 1882	Topographer of the Department of the Interior.
White-Fraser, G. W. R.	Ottawa, Ont.	Feb. 21, 1888	Dominion Topographical Surveyor.
Wiggins, T. H.	Regina, Sask.	" 18, 1886	
Wilkins, F. W.	Norwood, Ont.	May 18, 1881	Dominion Topographical Surveyor.
Wilkinson, W. D.	Toronto, Ont.	Feb. 22, 1893	
Woods, J. E.	Frank, Alta.	Nov. 14, 1885	
Young, W. B.	Winnipeg, Man.	Mar. 25, 1905	
Young, W. H.	Lethbridge, Alta.	May 16, 1907	

APPENDIX No. 12.

EXAMINATION PAPERS OF THE BOARD OF EXAMINERS FOR DOMINION LAND SURVEYORS.

EXAMINATION FOR ADMISSION AS ARTICLED PUPIL—FULL PRELIMINARY.

XXXI.

February 11 to 14, 1908.

PENMANSHIP AND ORTHOGRAPHY.

Write out correctly the following:

The propetty witch sault possesses of preszerving annimle substaineses from pewtrifacshun is reezolved by Liebig into too more jenniferel lause, the strong atracshun of sault for watter, and the nessessity of the presents of watter as a condishon of pewtrefashun. The intermeadiet fennomennon witch is interpollated between the remoat caws and the efekt can hear be not mearly infered but sean ; for it is a fammilyer fakt that flesh uppon witch sault has bin throne is speadely fownd swiming in bryne.

Wun has, two a sertin exstent, a powwer to awlter his karakter. Its being in the ultimmet ressort, fourmd for him, is not inkoncistent with its beeing, in part, fourmd by him as wun of the intermeadget ajence. His karektar is fourmd buy his serkumstanses (inklewding amung theas his partikuller organisashun), but his owen desyer to mold it in a partikkeller weigh, is one of thows sercumstanzes, and buy no menes the leest inflewenshel. We kannut, indede dirrektlie wil to bee diferant from wot wee arr. But neether did thows hoo arr supowsd to have fourmd ower karaktres, dyrrektlie wil that we shood bee wot wee arr. There wil hadd no dyrekt powwer exept owar there owen axions. They maid us wot they did maike us, buy nott the end, butt the rekwisit menes; and we, wen ower habbits are not two invetteret, can, by simmillarly wiling the rekwisit menes, maike owerselfs diferant. If they cood plaice us under the inflewents of sertin serkumstanzes, we, in lyke manor, can plaice owerselfs under the inflewents of other serkumstanzes. Wee arr exaktlie as kaipabel of maiking ower owen karrakter, *if we wil*, as othars arr of maiking it four uss.

SESSIONAL PAPER No. 25b

ARITHMETIC AND LOGARITHMS.

Marks.

(Time, 3 hours.)

1. Find the H.C.F. of 126025 and 40115; and of 12321 and 54345. 12
2. Find the Least Common Multiple of 50, 338, 675, 702 and 975. 12
3. How long would a column of men, extending 3420 feet in length, take to march through a street a mile long at the rate of 58 paces a minute, each pace being 30 inches? 12
4. Find the square root of 3 to seven places of decimals; and the cube root of 27054.036008. 16
5. If $\log \sin a = 9.2873493$
 $\log \tan b = 1.7854321$
 $\log \cos c = 8.9583428$
 Find a , b , and c and the angle whose tangent is $\tan b \cos c$.
 If, further, $\log \tan d = 1.7854321$, find $b + d$. 16
6. Find from the Tables,
 $\log 23.487$,
 $\log .023487$,
 $\log \sec 97^\circ 23' 54''$
 $\log \sin 118^\circ 23' 37''.3$ 16
7. Find by logarithms the value of
 $(93.285)^{\frac{1}{3}} \times (0.85)^{-\frac{1}{3}} \times (.0035)^{\frac{1}{4}} \div (107.34)^{\frac{1}{5}}$ 16

ALGEBRA.

(Time, 3 hours.)

Marks.

1. Reduce to its lowest terms

$$\frac{2a^4 + 3a^2x - 9a^2x^2}{6a^4x - 17a^3x^2 + 14a^2x^3 - 3ax^4}$$
 12
2. Find the least common multiple of
 $6(a^2 - b^2)(a - b)^3$, $9(a^4 - b^4)(a - b)^2$ and $12(a^2 - b^2)^3$. 13
3. Simplify :

$$\left\{ \frac{x^2 + y^2}{x^2 - y^2} - \frac{x^2 - y^2}{x^2 + y^2} \right\} \div \left\{ \frac{x + y}{x - y} - \frac{x - y}{x + y} \right\}$$
 15
4. A party were to divide their expenses equally. Had there been three persons more and each paid 5 cents more, the bill would have been \$3.75 more; but if there had been 10 persons less, and each had paid 7 cents less, it would have been \$9.56 less. How many persons were there and how much did each pay ? 15

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Marks.

5. Solve the simultaneous equations :

$$\begin{aligned}x + y + z &= a + b + c \\bx + cy + az &= cx + ay + bz \\&= ab + bc + ca\end{aligned}$$

15

6. Solve the equations:

$$\begin{aligned}2 \left(x^{\frac{1}{n}} + x_1^{-\frac{1}{n}} \right) &= 5 \\(x^2 + a)(x + b) &= ab\end{aligned}$$

15

7. Divide 40 into two such parts that the sum of their squares shall be 818.

15

PLANE GEOMETRY.

FIRST PAPER.

Marks.*(Time, 3 hours.)*

1. What is the difference between an axiom and a postulate? What is meant by 'reductio ad absurdum'?

12

2. If two triangles have two sides of the one equal to two sides of the other, each to each, and also the angles included by the equal sides equal, the triangles are equal in all respects.

12

3. In what cases does equality of three of the six parts (three sides, three angles) each to each in two triangles, involve equality of the triangles?

12

4. All the exterior angles of any rectilinear figure, made by producing the sides successively in the same direction, are together equal to four right angles?

12

5. The sum of the angles of a square is equal to four right angles. Is the converse true? If not, why not?

13

6. If a straight line be bisected and produced to any point, the square on the whole line thus produced, and the square on the part of it produced, are together double of the square on half the line bisected, and of the square on the line made up of the half and the part produced.

13

7. What algebraic proposition corresponds to the proposition in Question 6? State the geometric proposition corresponding to the algebraic one:
 $(a + b)(a - b) + b^2 = a^2.$

13

8. Wherein is a geometrical proof of the properties of squares or rectangles with relation to their areas, more complete than an algebraic one?

13

SESSIONAL PAPER No. 25b

PLANE GEOMETRY.

SECOND PAPER.

Marks.

(Time, 3 hours.)

- | | |
|---|----|
| 9. Describe a square that shall be equal to a given rectilineal figure. | 12 |
| 10. If in a circle two straight lines cut one another, which do not both pass through the centre, they do not bisect each other. | 12 |
| 11. The opposite angles of any quadrilateral figure inscribed in a circle, are together equal to two right angles. | 12 |
| 12. From a given circle cut off a segment which shall contain an angle equal to a given rectilineal angle. | 12 |
| 13. To describe a circle about a given triangle. | 13 |
| 14. What is meant by incommensurable magnitudes? Give a geometrical instance of incommensurability. | 13 |
| 15. If an angle of a triangle be bisected by a straight line which cuts the opposite side, the segments into which this side is divided are in the same ratio as the other sides of the triangle; and conversely. | 13 |
| 16. In equal circles, angles, whether at the centres or circumferences have the same ratio which the arcs on which they stand have to one another; so also have the sectors. | 13 |

PLANE TRIGONOMETRY.

Marks.

(Time, 3 hours.)

- | | |
|---|----|
| 1. Deduce the expression for the area of a triangle in terms of its sides. | 16 |
| 2. Prove that
$\sin (A + B) \sin (A - B) = \sin^2 A - \sin^2 B,$
and that
$\cos (A + B) \cos (A - B) = \cos^2 A - \sin^2 B.$ | 16 |
| 3. Given
$a = 35.3, b = 54.7, A = 33^\circ 25'$
solve the triangle. | 17 |
| 4. Given
$b = 17.34, c = 29.85, A = 125^\circ 43',$
find a . (Do not solve by natural trigonometric functions.) | 17 |
| 5. Given
$A = 25^\circ 33', B = 117^\circ 08'; a = 125.33,$
find c . | 17 |
| 6. Given
$a = 23.5, b = 37.7, c = 31.2,$
find the angles. | 17 |

SPHERICAL TRIGONOMETRY.

Marks.

(Time, 3 hours.)

- 1. State Napier's rules for the solution of right-angled spherical triangles. Deduce similar rules for the solution of triangles in which one side is a quadrant. 20
- 2. Given $c = 145^\circ$, $a = 25^\circ$, $C = 90^\circ$; solve the triangle. 20
- 3. Given $b = 123^\circ 15'$, $c = 135^\circ 10'$, $A = 15^\circ 27'$; find a . 20
- 4. Given $B = 140^\circ 10'$, $C = 55^\circ 42'$, $a = 63^\circ 26'$; find A . 20
- 5. Given $A = 125^\circ$, $B = 135^\circ$, $C = 85^\circ$; find a . 20

NOTE.—Do not use natural trigonometric functions in the solution of triangles.

MENSURATION.

Marks.

(Time, 3 hours.)

- 1. The sides of a triangular field are 3.54, 12.62 and 11.38 chains. Find the area in acres. 14
- 2. The perimeter of a field which has the form of a triangle similar to that in question 1 is 41.31 chains. What is its area? 14
- 3. What fraction of the earth's surface lies between latitudes 50° and 60° , and between longitudes 90° and 120° ? 14
- 4. On a certain map it is found that an area of 16,000 acres is represented by an area of 6.25 square inches. Determine the scale of the map in miles to the inch. 14
- 5. A right circular cylinder and a right circular cone stand on equal bases and are of the same altitude, the altitude being equal to the length of a diameter of either base. Find the ratio (a) of the curved surfaces; (b) of the whole surfaces of the cone and cylinder. 15
- 6. A cylindric tube 8 feet long and 2 feet 6 inches in diameter is closed at each end by a hemisphere. Find the area of the whole external surface. 15
- 7. The area of a field determined by chain measurement is afterwards found to be greater than it should be by one-fortieth part. What was the true length of the chain with which the first measurement was made? 14

EXAMINATION FOR ADMISSION AS ARTICLED PUPIL—LIMITED PRELIMINARY.

XIX.

February 11, 1908.

FIRST PAPER.

Marks.

(Time, 3 hours.)

- 1. Penmanship and Orthography. (Same as in the Full Preliminary Examination.) 50
200

SESSIONAL PAPER No. 25b

	Marks.
2. Given $\log 1.944 = 0.28869627$ and $\log 1.728 = 0.23754373$ find the logarithms of 45 and 75.	50
3. Two travellers A and B set out at the same time from two places, P and Q , and travel so as to meet. When they meet it is found that A has travelled 30 miles more than B , and that it will take A and B 4 days and 9 days respectively to complete their journeys. Find the distance between P and Q .	50
4. Find the value of $\frac{\sqrt{a+bx} + \sqrt{a-bx}}{\sqrt{a+bx} - \sqrt{a-bx}}$ when $x = \frac{2ac}{b(1+c^2)}$	50
5. If a quadrilateral figure is bisected by one diagonal, the second diagonal is bisected by the first.	50
6. From the formula $c^2 = a^2 + b^2 - 2ab \cos C$, and the analogous formulæ for the squares on the other sides, prove that $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}.$	50
7. Prove that $(\cos A + \cos B)^2 + (\sin A + \sin B)^2 = 4 \cos^2 \frac{1}{2} (A - B).$	50
8. Similar triangles are to one another as the squares on their homologous sides.	50

SECOND PAPER.

(Time, 3 hours.)

	Marks.
9. Two chimneys are of equal height. A person standing between them in the straight line joining their bases observes the elevation of the nearer one to him to be 60° . After walking 80 feet in a direction at right angles to the straight line joining their bases, he observes the elevations of the two to be 45° and 30° . Find their height, and the distance between them.	50
10. If the surface areas of a sphere, a cube and a regular tetrahedron are equal to one another, find the ratios of the diameter of the sphere, to the side of the cube and the edge of the tetrahedron.	50
11. Prove that the straight line bisecting an angle of a triangle, either internally or externally, divides the opposite side into parts which are in the same ratio as the other sides of the triangle.	50
12. Apply the preceding proposition to find the locus of a point whose distances from two given points are in a given ratio.	50
13. Given $b = 99^\circ 41'$; $c = 100^\circ 50'$; $A = 65^\circ 33'$, find a . (Do not use natural trigonometric functions.)	50
14. Given $c = 75^\circ 31'$; $a = 90^\circ$; $B = 30^\circ 53'$, find the other parts.	50
15. Find the value of $\left(\frac{23}{31}\right)^{\frac{1}{4}} + \left(\frac{13}{17}\right)^{-\frac{1}{6}} + \left(\frac{3}{4}\right)^{\frac{1}{3}} - \left(\frac{28}{39}\right)^{\frac{1}{12}}$	50

FINAL EXAMINATION FOR DOMINION LAND SURVEYOR.

XXXIX.

(February 11 to 18, 1908.)

PENMANSHIP AND ORTHOGRAPHY.

Marks.

(Time, 3 hours.)

The same paper is used as in the full preliminary examination.

{ 50
200

ALGEBRA.

Marks.

(Time, 3 hours.)

1. Find the G. C. M. of $2x^5 - 11x^2 - 9$ and $4x^5 + 11x^4 + 81$;
and the L. C. M. of $x^3 - 6x^2 + 11x - 6$, $x^3 - 9x^2 + 26x - 24$,
and $x^3 - 8x^2 + 19x - 12$. 10
2. Simplify $\frac{m^2 + n^2}{n} - m$
 $\frac{1}{n} \frac{1}{m} \left(\frac{m^2 - n^2}{m^3 + n^3} \right)$;
and $\frac{a}{b + \frac{c}{d + \frac{e}{f}}}$. 10
3. Solve $\left(\frac{x-a}{x+b} \right)^3 = \frac{x-2a-b}{x+a+2b}$;
and $4.8x - \frac{.72x - .05}{.5} = 1.6x + 8.9$. 10
4. Two persons, *A* and *B*, could finish a work in *m* days; they worked together *n* days when *A* was called off and *B* finished it in *p* days. In what time could each do it? 10
5. Solve the simultaneous equations:
 $x + y + z = a + b + c,$
 $bx + cy + az = cx + ay + bz = ab + bc + ca.$ 10
6. Show that the G. C. M. of two quantities is the G. C. M. of their common measures. 10
7. Solve $x^{-1} + x^{-\frac{1}{2}} = 6,$
and $x + \sqrt{5x + 10} = 8.$ 10
8. Find that number whose square added to its cube is nine times the next highest number. 10
9. What are eggs a dozen when two more in 24 cents worth lowers the price two cents per dozen? 10
10. Divide a given line into two parts such that twice the square on one part may be equal to the rectangle contained by the whole line and the other part. 10

PLANE GEOMETRY.

(Time, 3 hours.)

	Marks.
1. Describe a circle about a given triangle.	18
2. Prove that the perimeter of a triangle is less than the perimeter of any triangle which is drawn completely surrounding it.	18
3. Construct a rectangle equal to the sum of two given triangles.	19
4. In a triangle, BAC is the greatest angle. Prove that if a point D be taken in AB and a point E in AC , DE is less than BC .	19
5. Construct geometrically $a(a-x) = x^2$ where a represents the length of a line.	19
6. If two chords of a circle when produced intersect at a point without the circle, the rectangle contained by the segments of one chord is equal to the rectangle contained by the segments of the other chord.	19
7. If one pair of opposite sides of a quadrilateral inscribed in a circle intersect at a fixed point, the other pair of opposite sides intersect on a fixed straight line.	19
8. If an angle of a triangle be bisected internally or externally by a straight line which cuts the opposite side, or that side produced, the ratio of the segments of that side is equal to the ratio of the other sides of the triangle.	19

SOLID GEOMETRY.

(Time, 3 hours.)

	Marks.
1. Name the regular solids and give for each the number of faces, corners and edges.	8
2. The sum of any two plane angles of a trihedral angle is greater than the third angle.	8
3. If two intersecting planes be at right angles to the same plane, their common section is at right angles to it.	8
4. Polygons formed by cutting the faces of a polyhedral angle by parallel planes are similar to one another.	8
5. If the edge of a tetrahedron is 10 inches, what is the radius in inches of the sphere of equal volume?	11
6. If the edge of a tetrahedron is 10 inches, what is the radius in inches of a sphere of equal surface?	11
7. If the annual rainfall in the Khasi Hills is 610 inches, what is the weight of water yearly received by an acre, a cubic foot of water weighing 62.5 lbs.?	10
8. A cylinder 10 inches in diameter and 20 inches high is half full of water; into it is placed vertically a wooden cone, base 8 inches in diameter, height 10 inches, specific gravity of the wood .5; how high will the water rise in the cylinder?	11

SPHERICAL TRIGONOMETRY.

Marks.

(Time, 3 hours.)

1. Prove $\cos A = \frac{\cos a - \cos b \cos c}{\sin b \sin c}$ 13
2. Deduce $\tan \frac{1}{2} (A + B) = \frac{\cos \frac{1}{2} (a - b)}{\cos \frac{1}{2} (a + b)} \cot \frac{1}{2} C$. 14
3. Deduce $\tan \frac{1}{2} a = \sqrt{-\frac{\cos S \cos (S - A)}{\cos (S - B) \cos (S - C)}}$ 14
4. Prove Napier's rules. 14
5. Given $a = 68^\circ 20'$, $b = 52^\circ 18'$; $C = 117^\circ 12'$, find c . 14
6. The sides of a triangle are 105° , 90° and 75° respectively, find the sines of all the angles. 14
7. Given $B = 70^\circ$, $C = 100^\circ$, $a = 40^\circ$, find A . 14
8. Given $a = 32^\circ 12'$, $b = 30^\circ 15'$, $c = 28^\circ 18'$, find C . 14
9. Taking the radius of the earth as 4,000 miles, what is the approximate area of the triangle in square miles, whose spherical excess is $1''$? 14

MEASUREMENT OF AREAS AND SUBDIVISION OF LAND.

FIRST PAPER.

Marks.

(Time, 3 hours.)

1. In a triangular field, $AB = 10$ ch., $BC = 14$ ch., $CA = 12$ ch.; through the point within the field distant 8 chs. from A , and 6 chs. from B , a line is drawn bisecting the field; find the length of the dividing line. 17
2. Divide a quadrilateral in a given ratio by a straight line starting from a given point in one of the sides. 17
3. If the diameter of the sun is 800,000 miles, that of the earth 8,000, and their distance apart 92,000,000 miles, what is the limiting value in latitude of the circle of illumination at the time of the equinoxes, and what proportion of the earth's surface is directly illuminated, neglecting refraction. 17
4. Through the northerly part of Sec. 3, Tp. 33, R. 5, W. of 3rd M., runs a railway, width of right-of-way 100 ft.; the centre line crosses the western boundary of the section 10:20 ch. from the N.W. corner, and continues on a course N. 60° E. The part of the section lying south of the railway is to be divided into equal parts by a straight line running from the quarter section post on the southern boundary. What is the azimuth and length of the dividing line? 17
5. A kite-shaped race track is 50 ft. wide. The centre-line, half a mile long, is composed of two tangents, including an angle of 60° , and a circular arc connecting them. What is the length of the tangents, and what is the area of the track? 16
6. What is the ratio of the perimeters enclosing an area of n acres, by a circle, equilateral triangle, square, pentagon, hexagon and octagon? 16

MEASUREMENT OF AREAS AND SUBDIVISION OF LAND.

SECOND PAPER.

(Time, 3 hours.)

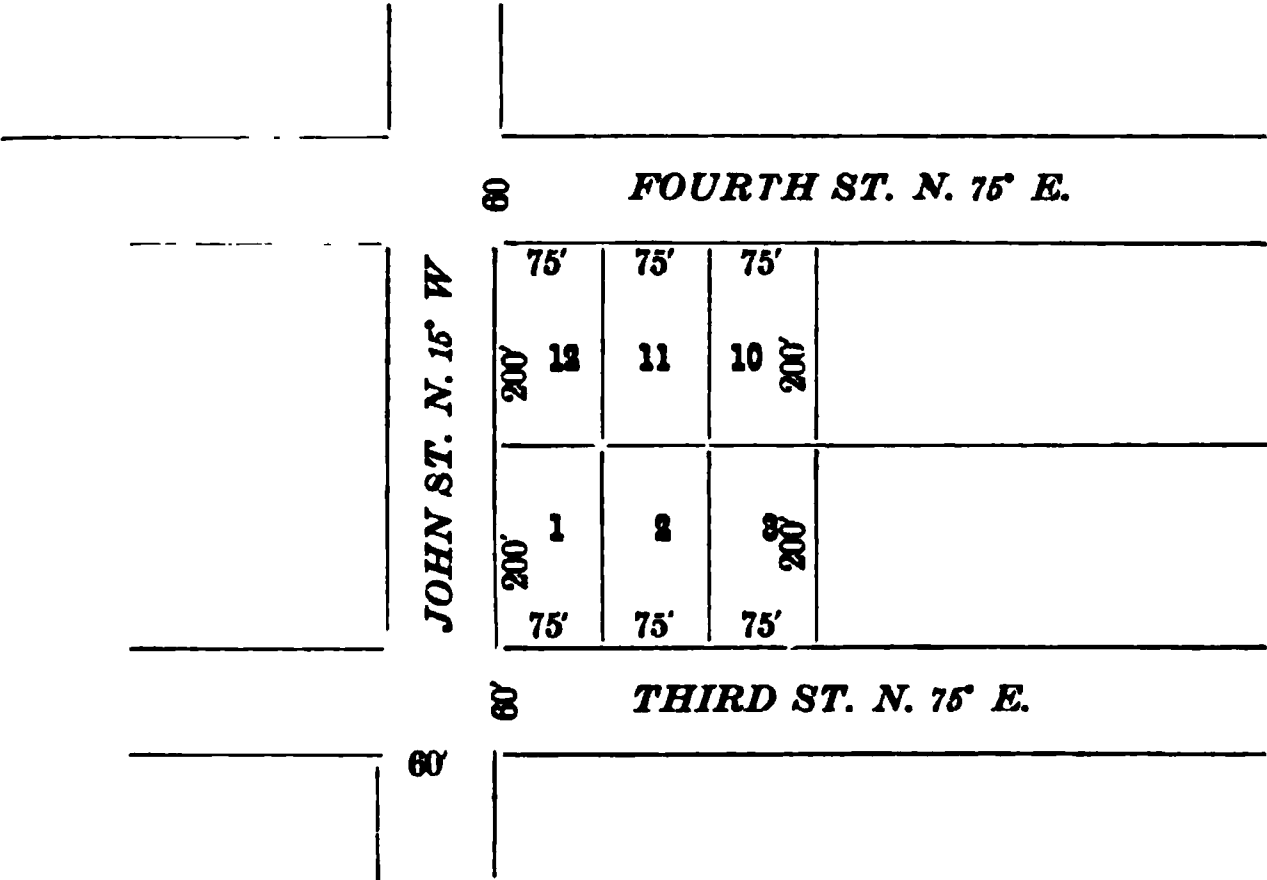
Marks.

7. The following are the notes of a survey:
- 1. S. 69° 15' E. 7.06 chains.
 - 2. N. 37° 15' E. 5.93 "
 - 3. N. 39° 30' W. 6.00 "
 - 4. S. 57° 45' W. 4.65 "
 - 5. S. 30° 00' W. 4.98 "
- Find the area by the method of Latitudes and Departures, first 'balancing' the survey. 40
8. Express the conditions necessary for a closed survey by two equations.
- (a) From these show what missing data in a survey can be supplied.
 - (b) Show when ambiguity may arise, and how the supplying of missing data affects balancing the survey. 20
9. Explain by diagram fully the rule: 'Twice the area of the figure is equal to the algebraic sum of the products of the double meridian distances of the several courses into the corresponding latitudes.' 20
10. What is the method of balancing a survey:
- (a) On the assumption that the error of closure is as much due to erroneous bearings as to erroneous chaining?
 - (b) On the assumption of erroneous chaining alone?
- What is the true area of the above field if the chain was one link too short? 20

DESCRIPTIONS.

(Time, 3 hours.)

Marks.



The above is part of the registered plan of the town of Holly in the County of Tweed and Province of Alberta. A sells to B a part of lot No. 1, and adjoining John and Third streets. The part sold is to have a frontage of forty feet on Third street to extend to the rear of the lot and the dividing line to be parallel to John street. Make a description for a deed. 25

Marks.

2. Using the plan of question 1. Supposing *A* to own lots Nos. 1 and 2, he sells lot No. 2 to *B*, and gives the right of ingress and egress to *B* by a lane, 16 feet wide, running along the whole of the rear limit of lot No. 1. Make the necessary description for the conveyance. 25
3. Moose Creek flows across the N. E. $\frac{1}{4}$ S. 12, T. 13, R. 15 W. in an easterly direction. *B* desires to buy the northerly part of the quarter section lying north of the creek, together with the creek. From measurement the southerly bank of the creek intersects the eastern and western quarter section lines respectively at 22^{ch} 12 and 20^{ch} 18 from the northern quarter section line. The whole area to be conveyed is supposed to contain 85 acres. Make a description for a deed. 25
4. Make a description for the remaining part of the quarter section given in question 3. 25

ASTRONOMY.

FIRST PAPER.

Marks.

(Time, 3 hours.)

1. Explain fully the equation of time, why it varies and when it is a maximum. A diagram is desirable. 14
2. The longitude of Ottawa is 5h. 02m. 52s. What kind of time is this? Why? 14
3. In latitude $45^{\circ} 25'$, longitude $75^{\circ} 43'$, what is the standard time of eastern elongation of Polaris, on May 27, 1904? 14
4. Without tables or computation give the approximate local mean time of eastern elongation of Polaris for any place in Ontario on the 20th of each month in the year. 14
5. For the same place and time as question 3, what was the azimuth of δ Urs. Min. at western elongation?
 $\delta = 86^{\circ} 36' 46''$; $a = 18\text{h. } 02\text{m. } 36\text{s.}$ 14
6. On the same date the observed altitude of Arcturus when on the prime vertical was $45^{\circ} 38'$. What is the latitude of the place? 15
7. What is the standard time of sunrise for the place and time of question 3? 15

SESSIONAL PAPER No. 25b

ASTRONOMY.

SECOND PAPER.

*(Time, 3 hours.)*Marks.

- | | |
|--|----|
| 8. On the 4th Base Line, R. V-VI, W. of 3rd M. on May 27, 1904, in the forenoon the mean of the observed altitudes of the upper and lower limb of the sun was $42^{\circ} 13' 30''$ when a watch showed 9h. 02m. 14s. What was the azimuth of the sun, and what was the error of the watch on standard time? | 17 |
| 9. In question 8, what was the true local sidereal time of observation? | 17 |
| 10. What is the longitude of the place for which the time shown by the watch in question 8, was at that instant the local sidereal time? | 17 |
| 11. On the 20th June, 1904, the altitude of the sun's centre at its lower or northern culmination was $10^{\circ} 32'$. What was the latitude of the place of observation? | 17 |
| 12. What is the standard time of rising for Arcturus for the time and place in question 8? | 13 |
| 13. What is the right ascension of a star that crosses the meridian of place and date of question 8 at 10 p.m. local mean time? | 16 |

MANUAL OF SURVEY.

FIRST PAPER.

*(Time, 3 hours.)*Marks.

- | | |
|--|----|
| 1. Where are the Initial Meridians now in use? | 3 |
| 2. Between what townships is the 73rd correction line? | 3 |
| 3. How is the deficiency or surplus on the meridians between two base lines disposed of? | 4 |
| 4. Define a bearing and an azimuth. | 11 |
| 5. To what meridian is a bearing referred in subdividing a township, and how is it deduced from an observed azimuth? | 11 |
| 6. What is to be done when the road allowance on a correction line is less than 80 links wide? | 5 |
| 7. In closing a correction line on an initial meridian, what is to be done when the meridian intersects the jog? | 7 |
| 8. Give the rules to be observed in measuring a distance by means of a triangle. | 5 |
| 9. When is a quarter section considered as sufficiently surveyed for disposal? | 5 |
| 10. What are the limits of error in a township subdivision survey? | 8 |
| 11. Describe the different kinds of posts, mounds, pits and trenches used in the present system of survey; show how and where they are placed. | 20 |
| 12. How is a settlement surveyed? | 11 |
| 13. How is a group lot surveyed? | 7 |

MANUAL OF SURVEY.

SECOND PAPER.

Marks.

(Time, 3 hours.)

- | | |
|---|----|
| 14. By what considerations is a surveyor to be guided in deciding whether a road allowance shall or shall not be left along the boundary of an Indian reserve when subdividing a township? | 4 |
| 15. What connections have to be made in a township subdivision survey? | 4 |
| 16. For what purposes are traverses made in connection with surveys of Dominion lands? | 5 |
| 17. Define the <i>bank</i> , the <i>shore</i> and the <i>bed</i> of a body of water. | 8 |
| 18. What are the rights of the owner of a piece of land fronting on a lake or river? | 11 |
| 19. What are the bodies of water to be surveyed in subdividing a township, and what are those which are not to be surveyed? | 9 |
| 20. In what cases is the area of the bed of a river to be deducted from the area of a quarter section crossed by it? | 6 |
| 21. When are both banks of a river to be traversed? | 4 |
| 22. What is to be done when the edge of a marsh varies ten chains or more according to the height of water? | 8 |
| 23. How are the following posts to be marked? | |
| (a) At the corner between sections 19, 20, 29 and 30, township 59, range 19, east of the principal meridian. | |
| (b) At the southerly corner between sections 4 and 5, township 67, range 22, west of the 3rd meridian. | |
| (c) At the southerly corner between sections 15 and 16, township 31, range 14, west of the 2nd meridian. (On the north side of the road allowance between two different systems of survey.) | |
| (d) At the southerly corner of township 103, between ranges 13 and 14, west of the 4th meridian. | |
| (e) At the witness mound placed 9 chains north of the S.E. corner of section 12, township 47, range 9, west of the 5th meridian. | 20 |
| 24. Define a resurvey, a retracement, a restoration survey, an obliterated corner, and a lost corner. | 8 |
| 25. Give the rules governing resurveys, retracements and restoration surveys. | 8 |
| 26. Under what circumstances is a subdivider justified in resurveying or re-tracing a township outline without instructions from the head office? | 5 |

SESSIONAL PAPER No. 25b

EXAMINATION FOR CERTIFICATE AS DOMINION TOPOGRAPHICAL SURVEYOR.

February 11 to 13, 1908.

XI.

ALGEBRA.

(Time, 3 hours.)

	Marks.
1. Show that $\frac{1}{1} \frac{3}{3} \frac{5}{5} \dots \frac{2n-1}{2n-1} > (\frac{1}{n})^2$	6
2. Find the number of ways in which (1) a selection, (2) an arrangement of four letters can be made from the letters of the word 'proportion.'	6
3. Find the sum of the products, two at a time, of the co-efficients in the expression of $(1+x)^n$, when n is a positive integer.	6
4. Prove that $1 + \frac{3}{8} + \frac{3 \cdot 5}{8 \cdot 10} + \frac{3 \cdot 5 \cdot 7}{8 \cdot 10 \cdot 12} + \dots = 2$	6
5. Express $\frac{1}{2} (e^{ix} + e^{-ix})$ in ascending powers of x when $i = \sqrt{-1}$.	5
6. The integral part of $\frac{1}{\sqrt{3}} (\sqrt{3} + \sqrt{5})^{2n+1}$ and the integer next greater than $(\sqrt{3} + \sqrt{5})^{2n}$ are each divisible by 2^{n+1}	6
7. A certain stake is to be won by the first person who throws an ace with an octahedral die. If there are 4 persons, what is the chance of the last?	5
8. Find the sum of the fifth powers of the roots of the equation: $x^4 - 7x^2 + 4x - 3 = 0$	5
9. Calculate the value of the determinant: $\begin{vmatrix} 3 & 2 & 1 & 4 \\ 15 & 29 & 2 & 14 \\ 16 & 19 & 3 & 17 \\ 33 & 39 & 8 & 38 \end{vmatrix}$	5

PLANE AND SPHERICAL TRIGONOMETRY.

(Time, 3 hours.)

	Marks.
1. Sum to n terms the series: $\sin 3\theta \sin \theta + \sin 6\theta \sin 2\theta + \sin 12\theta \sin 4\theta + \dots$	9
2. If x be the circular measure of a positive angle less than a right angle, $\sin x$ is greater than $x - \frac{x^3}{6}$	9
3. Compute the ratio ($=\pi$) of the circumference of a circle to its diameter.	8
4. Solve the equations (1) $\sin 9x + \sin 5x + 2 \sin^2 x = 1$ (2) $\frac{\cos^3 a}{\cos x} + \frac{\sin^3 a}{\sin x} = 1$	9
5. (a) Explain the principle and derivation of addition and subtraction logarithms. (b) Give illustrations of applicability.	8

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Marks.

6. Given the equation $\tan z = \frac{m \sin a}{1 + m \cos a}$ to express z in a series of multiples of a . 8
7. (a) Give the three fundamental equations for the general spherical triangle.
 (b) Give the solution of oblique spherical triangles by means of a perpendicular, applying same to Case I, given b, c , and A ; Case II, given A, C , and b . 8
8. Adapt the expression $a \cos A + b \cos B + c \cos C$ to logarithmic computation, the letters denoting the sides and the angles of a triangle. 8
9. If k is the area of a spherical triangle, show that

$$\tan \frac{1}{2} k = \sqrt{\tan \frac{1}{2} s \tan \frac{1}{2} (s-a) \tan \frac{1}{2} (s-b) \tan \frac{1}{2} (s-c)} \quad 8$$

ANALYTICAL GEOMETRY—TWO DIMENSIONS.

Marks.

(Time, 3 hours.)

1. Find the equation of a straight line in terms of its intercepts on the axes of coördinates. 8
2. Define 'anharmonic ratio,' illustrating by a diagram. 8
3. Deduce the equation to the tangent to the circle $x^2 + y^2 = a^2$ at the point x, y . 8
4. Define 'radical axis,' and prove analytically that the radical axes of three circles meet in a point. 8
5. Write down the equation to the ellipse referred to its centre and axes. Prove that the sum of the two focal distances of a point on the curve is equal to the major axis and that the perpendicular to the directrix is in a constant ratio to the focal distance. 8
6. Find the equation to the normal to the ellipse at a given point on the curve. How many normals may be drawn to the ellipse from a point not on the curve? 10

Three Dimensions.

7. Write down the equation to a straight line given the coördinates of two points upon it, and find the angles which it makes with the axes of coördinates. 10
8. Give formulæ for the transformation of coördinates, without changing the origin, in terms of the direction cosines of the new axes as referred to the old. 12
9. Find the condition that the plane $lx + my + nz + p = 0$ may touch the conicoid $ax^2 + by^2 + cz^2 + d = 0$. 12
10. Prove that the sections of an ellipsoid by parallel planes are similar ellipses. Hence deduce the relation between the radii of curvature of the sections of an ellipsoid made by different planes containing the normal at a given point. 16

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DESCRIPTIVE GEOMETRY AND PROJECTIONS.

Marks.

(Time, 3 hours.)

1. Two intersecting straight lines being given by their projections, find the angle of the lines. 8
2. Two straight lines which do not intersect being given their projections, find the shortest line joining them. 9
3. Given the declination and hour angle of a star and the latitude of the place, find the azimuth of the star. 9
4. Give the definition of the picture plane, principal point, horizon line, distance points and vanishing points in a perspective.
Given the altitude of a point above the ground plane and its horizontal projection, find its perspective. 9
5. It is desired to construct a map of Canada comprised between latitudes 42° and 60° north and longitudes 56° and 141° W. of Greenwich. Comparing the polyconic and the secant conical projections, what are the maximum errors of representation in each case? 15
6. In a perspective projection, explain how you find where the point of vision must be placed in order that the total misrepresentation over a given area be a minimum. 15
7. Define the conical Orthomorphic projection (Gauss' or Lambert's second). What are its properties and for what kind of maps is it best adapted? 10

DIFFERENTIAL AND INTEGRAL CALCULUS.

Marks.

(Time, 3 hours.)

1. Differentiate with respect to x

$$\log \left\{ 2x - 1 + 2 \sqrt{x^2 - x - 1} \right\}$$

$$e^x \tan^{-1} x$$

$$\cos^{-1} \left\{ \frac{3 + 5 \cos x}{5 + 3 \cos x} \right\}$$
 10
2. If A be the chord of any circular arc, B that of half the arc, prove that the length of the arc is equal to

$$2 B + \frac{1}{3} (2 B - A).$$
 with an error which, for an arc equal to the radius, is less than 1 in 7680. 10
3. From Taylor's series derive John Bernoulli's series. 10
4. If u is a homogeneous function of x and y of the n^{th} degree, prove that

$$x \frac{du}{dx} + y \frac{du}{dy} = nu$$
 10
5. Find the maximum value of $x^{\frac{1}{x}}$, also its limiting value when $x = 0$ or ∞ . 10

6. Find the radius of curvature of an ellipse at the point where the normal makes an angle of ϕ with the major axis. 10
7. Sum the series
$$p_1 + \frac{1}{2} p_2 + \frac{1}{3} p_3 + \dots \dots \dots \frac{1}{n} p_n$$

where $\frac{1}{p_r} = \frac{n}{r} + \frac{r}{n}$
when n is indefinitely increased. 10
8. Obtain a formula of reduction for the integral
$$\int e^{ax} \cos nx \, dx$$
 10
9. State Simpson's Rule and apply it to determining the area of an ellipse included between two ordinates to the major axis. 10
10. Find the volume and moment of inertia about its axis of a section of a paraboloid formed by revolving the parabola $y^2 = 20x$ about the axis of x , the section being bounded by the planes $x = 0$ and $x = 10$. 10

PROBABILITY AND LEAST SQUARES.

- (Time, 3 hours.)
- Marks.
1. Two independent witnesses, A and B , whose probabilities of speaking the truth are p and q , respectively, agree in a statement of which the *a priori* probability of truth is P . What is the probability that the statement is true? 15
2. A phenomenon of which the causes are unknown has been observed to recur at regular intervals. If it has thus happened n times, what is the probability that it will occur m times more? 15
3. Write down the equation to the curve of probability of error of observation. Indicate its form in a general way, and show the relation to the curve of the mean square error, the probable error and the average error. 20
4. Two sets of measurements are made with results a and b , with probable errors r and r_1 respectively. Find the most probable value got by combining them, and its probable error, when (a) a and b are measured lengths of the same rod.
(b) When a is a zenith distance, and b is a declination from which the latitude is required ($b \pm a$)
(c) When a and b are latitudes determined by moon culminations observed on the east and west limbs of the moon respectively. 25
5. In indirect measurements, when n observations have been made and there are m unknown quantities, describe briefly the process of finding the most probable value of each quantity and its probable error. 25
6. In direct measurements of quantities which are not independent of one another, show how the most probable values are found. Explain the method of elimination, also that of correlates. 25
7. Indicate how the method of least squares is used in finding values for the constants of formulæ, also in the formation of empirical formulæ. 25

REPORTS OF SURVEYORS

GENERAL REPORTS OF SURVEYORS

1907-1908

APPENDIX No. 13.

REPORT OF C. F. AYLSWORTH, JR., D.L.S.

RESURVEYS IN EASTERN MANITOBA.

MADOC, February 26, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—

I have the honour to inform you that in accordance with your instructions dated April 9, 1907, to make a resurvey of townships 16 and 17, range 8, and the incomplete portions of townships 14, 15 and 16, range 7, and township 15, range 8, I left Madoc on April 22 and arrived in Winnipeg on the 24th.

I proceeded at once to organize a party and complete the necessary camp and transport equipment, as well as to secure provisions.

On May 2 I arrived at Beausejour with my party, and on the 4th sent for the horses and wagons, which were ten miles from this place. The horses had been well taken care of but hay was getting rather scarce as the winter had been an unusually long and severe one. Though great quantities of hay were harvested there last fall, the price per ton rose from three to ten dollars and farmers were compelled to turn their stock out grazing early in the spring.

Vegetation was very backward, till warm weather and rain began on June 10. The rain flooded the sloughs, limiting the grazing area for the cattle to the uplands, so that grazing conditions did not improve as the season advanced, and the stock went into winter quarters in poor condition.

The flooding of the hay-sloughs rendered it difficult for the farmers to secure hay for their stock for the following winter, as they were compelled to cut their hay in water up to their knees and haul it to the uplands to dry. This condition of affairs existed more particularly in township 15, range 7. It is asserted by the settlers in this township that with a strong west wind the waters of lake Winnipeg are forced up over these flats.

On May 9 we moved from Beausejour to section 21, township 14, range 7. The bush roads were very difficult to travel as the snow was still about a foot deep, and as the ground was frozen it made mounding very difficult. In order to perform this work satisfactorily, I decided to postpone it until the frost had entirely disappeared.

In township 16, range 8, very few traces of the original survey could be found, the corners along the west of the township boundary, and along the east boundaries of sections 31, 30, 19, 18, 7 and 6 being entirely obliterated.

Except in the west half of township 16, range 8, and the west side of township 15, range 7, settlement was very scattered on account of the unproductive quality of the soil. Large areas of it are rolling jackpine, sand and gravel ridges, tamarack,

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muskeg and large tracts of stony ground. Some of the settlers obtained sufficient stone to assist very materially in building fences.

The crops developed rapidly after favourable weather set in on June 10, and there were fine prospects of a good harvest, but after threshing the yield was only twenty-five bushels per acre, or half of what was expected, while the quality was inferior.

In township 15, range 8, there is a ditch along the south boundary, another running easterly along the north side of sections 7, 8, 9, 10, 11 and 12, another running along the north boundary of sections 19, 20, 21, 22, 23 and 24, and one partially across the north boundary of section 30. The west boundary of the township is also ditched. The remaining road allowances running east and west and the road allowance along the east boundary have been cleared out, measured and levelled, but no ditches are yet constructed along these roads. The excavations of the pits which mark the road allowances along which the ditches were constructed immediately filled with water, and as the whole township was practically covered with water it would be impossible for us to move our outfit into the township except when the ground was frozen.

Game was very scarce in this township owing no doubt to the land being so badly flooded.

I have the honour to be, sir,

Your obedient servant,

C. F. AYLSWORTH, *D.L.S.*

APPENDIX No. 14.

REPORT OF DAVID BEATTY, *D.L.S.*

MISCELLANEOUS SURVEYS IN SOUTHERN ALBERTA.

PARRY SOUND, April 4, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—

I have the honour to submit the following report of my surveys of 1907.

Under your instructions to make restoration survey of several townships in the vicinity of Lloydminster I went to Prince Albert where I had wintered my horses and stored my outfit in 1906, and after collecting and repairing my outfit, I shipped it to Lloydminster. Here I found further instructions to investigate the necessity of making a restoration survey of township 50, range 27, west of the third meridian. I also found a telegram directing me to go south to township 28, range 6, west of the fourth meridian, and survey seven townships in that vicinity. While waiting for definite instructions and sketches, I investigated the necessity of a resurvey of township 50, range 27, by driving over the township and interviewing nearly all the settlers in it. The only missing monuments were the quarter-section corners on the east and west sides of section 34. These I established, as they had not been built in the original survey.

I then returned to Lloydminster and waited a few days for final instructions for the survey south of Sounding lake. After receiving these I moved south over a fairly good graded road along the fourth meridian for about thirty-two miles, crossing Battle river about thirty miles south of Lloydminster, then by trail to the east side of

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Sounding lake, where there is a small detachment of mounted police, thence to township 32, range 6, where I traversed a lake. I then moved into township 31, range 6, which I subdivided, or rather retraced, finding only a few monuments missing. I resurveyed townships 30, 29, 28 and 27, range 6 and townships 27 and 28, range 7. In townships 27 and 28, ranges 6 and 7, the greater number of the monuments were not built, although the iron posts were nearly all planted and marked and many of the quarter-section corners were marked with a wooden stake about two inches square. The description of one of these townships practically covers them all as to suitability for agricultural purposes. The soil is mostly clay, without any black soil on top, and the face of the country is rolling prairie, except township 27, range 6, which is more hilly with gravel and stones on the hills. There is a scarcity of good water in all that part of the country. In township 30, range 6, the only water in the dry season is Sounding creek, which crosses the township from west to east. In township 29, I found one small slough which served for watering the horses, but I had to draw water from Sounding creek for camp use. In township 28, range 6, I drew water from Sounding creek for both the horses and camp use, although there was some water in holes in a large slough or lake, but the horses could not reach it without miring. In township 27, range 6, I found a spring in the northwest corner of section 2, which was the only water fit for use in the township. In township 27, range 7, I found a spring on the east side of section 9. I found no water in township 28, range 7. There is no wood for fuel in any of the townships surveyed.

I have the honour to be, Sir,

Your obedient servant,

DAVID BEATTY, *D.L.S.*

APPENDIX No. 15.

REPORT OF P. R. A. BELANGER, *D.L.S.*INSPECTION OF CONTRACTS, AND MISCELLANEOUS SURVEYS
IN NORTHERN ALBERTA.

OTTAWA, March 16, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—

I have the honour to submit the following general report on my operations during the past season in connection with the verification and rectification of some survey marks in the Yorkton district and the inspection of contract surveys in that part of the Edmonton district west of the fifth meridian.

I received your instructions on April 15, and at once made the necessary preparations for an eight months' expedition, securing also from the office all the necessary plans and sketches in reference to my work, but it was April 21 before I could leave for the West.

On my arrival at Prince Albert, I organized my party and sent part of it via Birch hills to Domremy to secure my transport outfit, which I had left the year before in care of C. B. Duval, and to drive down to Humboldt, while myself and two other members of the party met them at the latter place on May 2, by rail from Prince Albert via Warman.

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On the 4th my assistant, Mr. A.L. Cumming, joined the party at Humboldt, and after making my final preparations at that place I proceeded to Englefeld, in township 37, range 19, west of the second meridian, for my initial work which consisted of the traverse of Luse lake, which had been omitted in the original survey.

This work occupied me only one day, after which I started for 'Round Plains.' From Humboldt to Englefeld I followed the road along the Canadian Northern railway and from the latter village I travelled south to Prairie Rose. All along the way I passed through colonies of German Catholic settlers, who, though newly arrived in the country, are all very prosperous and highly satisfied with the location. Villages with stores, hotels and churches are erected at every railway station, attesting the progress of these enterprising settlers.

From Prairie Rose I travelled across the prairie on the west side of Quill lake till I reached the old Touchwood trail, which I followed to 'Round Plains,' which locality I reached on May 13.

Here, my work consisted of the retracement of the east boundary of township 29, range 15, together with the resurvey of the north boundary of the adjoining sections in ranges 14 and 15. This resurvey was accomplished without any difficulty, the land being vacant, and the original marks for quarter sections on section chords entirely obliterated.

As already mentioned in previous reports there are not many settlers at 'Round Plains'; the land is the best that can be desired, but as it is owned by a private firm who hold it at a high price, it may be some time before it becomes thickly settled.

From 'Round Plains' I proceeded to township 23, range 11, via Touchwood Hills mission, and Lipton, a thriving little town on the Pheasant Hills branch of the Canadian Pacific railway, where I stopped for a few hours to buy supplies before going on to my destination.

In this township my work consisted of the correction of an error of ten chains which had been made in the original subdivision along the west boundary of the Indian reserve. I also resurveyed the section chords affected by the error. This correction was made without trouble, the northeast corner of the defective homesteaded section being entirely obliterated, and the settlers having been made aware of the error when I discovered it in 1904, had made their improvements so as not to encroach on the adjoining land.

My next work consisted in removing and replacing to proper places witness mounds in townships 25, ranges 9 and 10, which had been placed on the road allowance, after which I proceeded to investigate the discrepancies shown in the description of survey monuments restored by me in 1902 in numerous townships in the Yorkton district, as compared with their description in the notes of the original surveys.

The rectification of all these discrepancies extending over twenty townships kept me busy till June 28, without interruption, and though I limited my work to the location and rectification of the erroneously described marks, avoiding as much as possible making any changes which might cause disturbance among the settlers, though I detected numerous large errors which I would have corrected had the land been vacant.

The large tract of land just referred to which only a few years ago was mostly vacant is now thickly settled; it is crossed by the Pheasant Hills branch of the Canadian Pacific railway, along which thriving towns have been started at every station.

On June 29 I started for Kamsack, where I arrived on July 2. A few miles south of this town I passed through a Doukhobor village where I saw the finest fields of wheat in the whole country I had travelled over, but I was greatly shocked to see a large herd of cattle grazing in it, and as near by several women were gardening or digging snake roots, I tried to make them understand that it was a crime to allow the cattle to destroy their crop, and offered them help to chase the herd from their field, but they only laughed at me and shook their heads in sign of refusal, convincing

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me that they were premeditating another pilgrimage in the fall in search of the Messiah, who would provide for them. These people are to be pitied for their monomaniac affliction; they are a very moral and industrious people and would make a desirable class of settlers if they could do away with their foolish practices.

On July 3, I shipped my outfit by rail to Edmonton, and boarded the train with my party on the next day for the same place. On my arrival there, I reorganized the party and completed my outfit for the inspection of contract surveys west, north and northwest of lake St. Ann. This work for the most part lasted for the remainder of the season, and involved much loss of time in travelling from one contract to another, owing to the character of the country, which is mostly timbered and much broken by tamarack swamps, principally in Mr. Baker's contract west of lake St. Ann. Here the country is low and was flooded by the heavy rainfall of last season which rendered the roads almost impassable for vehicles. To enter the country north and northwest of lake St. Ann from this place, I had to make a circuit via Riviere-qui-barre and Belvedere crossing on Pembina river. From here the Chalmers road leads towards the north to a ferry at Arthabaska river, crossing in township 61, range 5, west of the fifth meridian, in R. H. Knight's contract, while the 'Peavine prairie' road branches westerly across the renowned valleys of Pembina and Paddle rivers, and runs across the contracts of R. H. Cautley, Thos. Drummond, H. McGrandle and M. Kimpe. This road can be followed with wagons to within six miles of the mouth of McLeod river, where the country becomes so rough and hilly that a pack train has to be used to reach the river, where there is a small Hudson's Bay Company's post.

Separate detailed reports on the eight contracts I examined have already been supplied giving my appreciation of the work inspected in every contract, and I do not think it necessary to enter into further details as to the merit of the work, which in general was found satisfactory.

The country covered by Mr. Knight's contract comprises township 60, range 2, and townships 61, ranges 1 to 5, west of the fifth meridian and is reached from Edmonton via Riviere-qui-barre, Belvedere and Chalmers road which runs across township 61, range 5, and by roads branching from the Chalmers road and running along Pembina and Paddle rivers. It has been greatly overrun by fires in the past, and now the dry land is overgrown with shrub and vetches, affording considerable good land ready for homesteading. The low land is covered with spruce and tamarack, good for all building purposes.

A few squatters were found in township 61, range 3, and in the valley of Athabaska river in range 5 at a short distance from the ferry.

From Belvedere the 'Peavine prairie' road leads to township 59, range 5, in Mr. R. H. Cautley's contract, which covers townships 58 to 60 inclusive of the same range. Several settlers were found in townships 58 and 59, where large tracts of scrubby brulé are found, but township 60 is heavily timbered with large spruce which I believe is included in a timber berth that will prove very valuable some day, if it is not destroyed by fires.

Mr. Thos. Drummond's contract covers townships 57 to 60, range 6, and as far as could be judged by the three townships inspected, the soil is good but it is mostly timbered, though patches of brulé are found here and there, but they are overgrown by a heavy second growth. Township 60 is entirely covered by large spruce alternating with tamarack swamps. A few large hay-meadows are found along creeks and lakelets in townships 58 and 59 and settlers were already searching for them.

From range 6 we inspected Mr. H. McGrandle's contract, covering townships 57 to 59, range 7, where the country becomes much more open, and the soil improves to first class. The land is covered with light scrub and a fine growth of vetches which affords very good pasturage for horses and cattle. This brulé appears to extend over township 58 and the southeast part of township 59, while the northwest part of the latter is heavily timbered with large spruce, which appears to be the continuation

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of that belt of heavy timber referred to in ranges 5 and 6, and appears to extend northerly to Athabaska river.

The wagon road enters on section 1 of township 59, and turns south and south-westerly across township 58, leaving it on section 18 to enter 'Peavine prairie' country in range 8, which forms part of the contract of Mr. M. Kimpe, which extends westerly to the mouth of McLeod river. This little prairie is 'the promised land' of settlers looking for a homestead, it is nothing but a burnt tract of country, covered with a high growth of vetches, climbing in short scrub, which at a distance gives it the appearance from which it derives its name.

In range 9 the country is also much opened, and squatters are scattered here and there along Paddle river, and all speak highly of the country of their adoption.

The large tract of land just above described, extending from range 5 to range 9, is well watered by Pembina river, Paddle river and numerous small streams and lakes in which fish abound. The soil is rich and very suitable for farming purposes. Numerous settlers with their families were met on the way back, going into that country to make a home.

Returning from township 58, range 9, to lake St. Ann I followed a wagon road which has been lately opened by different surveyors and settlers. This road, though very bad in summer time, was found fairly good in the fall, and as it is the most direct and shortest route to the 'Peavine prairie' and Paddle river valley, the local government of Alberta, which has at heart the development of that country, has already expended large sums of money during last season on the part east of lake St. Ann and northwest via 'the narrows' to about two miles west of that point, where I met the first gang of workers.

These improvements consist in cutting a road one chain wide through the bush and grading all soft places, or making corduroys over tamarack swamps.

This road will prove a blessing to the settlers, one of whom was so discouraged by his hardships over this road last summer that he left his homestead never to return. It will greatly help to develop the 'Peavine prairie' country as well as Pembina and Paddle river valleys, and will most probably in the future be extended into Peace river valley via the mouth of McLeod river and Sturgeon lake by following the pack trail already existing.

The thing now most needed is a good ferry at 'the narrows' at lake St. Ann, where there is only a small raft manned by the Indian chief of the reserve at that place, who charges what he likes for the poor accommodation he furnishes.

The contracts I inspected west of lake St. Ann comprise townships 54, 55 and 56, range 5, surveyed by the late A. Michaud under contract No. 19 of 1906, townships 54 and 55, range 7 in contract No. 21 of 1906, by R. H. Knight, and contract No. 2 of 1907, comprising township 54, range 9, and townships 53 and 54, range 10, together with part of contract No. 24, extending westerly from contract No. 2, both made by J. C. Baker.

Two roads lead to contract No. 19, one the Government road from 'the narrows' runs across township 55, while the other follows the old Jasper House trail as far as Sandy McDonald's place on section 24, township 54, range 5, from which place A. Michaud cut a road northwesterly across townships 54 and 55 meeting the Government road in the latter township.

I did not meet with any settlers in contract No. 19, but the land is good and I have no doubt it will be taken up soon. For the present it is mostly heavily timbered with spruce which is very suitable for lumbering as well as building purposes.

Contract No. 21 is reached by following the Jasper House trail as far as Pierre Gray's place in township 53, range 6, and then by branching from there northwesterly over Yak's trail which is followed to a point two miles past the crossing of Pembina river where Mr. R. H. Knight cut a road northerly across township 54 as far as the centre of township 55, in range 7.

No actual settlers were found in these townships, but the land being first class I have no doubt the northern part of township 54, and the southern row of sections in township 55, will soon be taken as they are partly open, but the remainder of this contract is rather heavily timbered with poplar, and consequently not ready for homesteading.

At Lambert's I left my vehicles and part of my camp equipage, and proceeded from there to Mr. J. C. Baker's contract with a pack-train. At the start I crossed Lobstick river, a tributary of Pembina river, and the outlet of Chip lake, and a short distance farther passed by the two last settlers to be met with on this trail before entering Mr. Baker's survey, which is only a few miles farther west.

The timber, in general, is good for building purposes, and in ranges 11 and 12 spruce may be found suitable for lumbering.

The country above described, though poor in appearance for farming purposes, is bound to be developed some day and bring its share of revenue from its mineral resources, and its proximity to the Grand Trunk Pacific railway, whose location runs through it, will afford transportation for fire-wood as well as coal, which is found in abundance in that district along this railway, construction of which is now under contract and will be in full swing by next summer.

I do not know of any other mineral in this vicinity, but the lumbering industry can be carried on to a large extent in the places above referred to, principally in townships 60, ranges 5, 6 and 7, where lumbering will prove a very remunerative business.

While on the subject of curiosities, I might mention that I found in the bed of Athabaska river a curiously shaped stone resembling in colour and shape a petrified human heart, which if not really such is wonderful as a specimen of the action of water on pebbles.

During the season I saw only two deer, and I believe that they as well as all fur bearing animals have to migrate farther north across Athabaska river to flee before the settler intruding on their domain.

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Small game, such as geese, duck and partridge is very scarce, even hares could hardly be found last season, but I believe the scarcity of the latter is only due to the periodical disease which kills them off, although they become even more numerous after a while.

From November 16, to 19, I made some retracement surveys in township 53, range 3, west of the fifth meridian, as required by your instructions dated September 3, 1907, after which I intended to continue the inspection of the additional part of contract No. 24, but the contractor not having yet finished his survey and being unable to secure anybody to freight oats for my horses, I was advised not to undertake the journey to McLeod river at such a late season of the year when no feed could be obtained for horses in that bush country. I therefore decided to postpone the inspection till next spring, and after storing my outfit with Mr. Angus McDonell, of Ray, I returned to Edmonton where I discharged my party and took the train for Ottawa, where I arrived on December 8.

I have the honour to be, sir,

Your obedient servant,

P. R. A. BELANGER, *D.L.S.*

APPENDIX 16.

REPORT OF LEWIS BOLTON, *D.L.S.*

MISCELLANEOUS SURVEYS IN THE VICINITY OF THE PAS, SASKATCHEWAN.

Listowel, November 15, 1907.

E. DEVILLE, Esq., LL.D.
Surveyor General,
Ottawa.

SIR,—I have the honour to report that in accordance with your instructions dated June 10, 1907, I left Listowel on July 1, for The Pas, to make certain surveys in that vicinity. I arrived in Winnipeg on July 4, purchased my supplies, had my transit overhauled and engaged one man to accompany me on the work. I left Winnipeg on July 10 for Winnipegosis, where I arrived on Thursday, July 11. I found the steamer *Lottie S.*, owned by the Northwest Fish company, was the only boat moving on the lake, and that she would not connect with the steamer *Cumberland* on Cedar lake for The Pas until Wednesday, July 24. I arrived at The Pas on the evening of the 24th. Next day I took a look over the survey made by Mr. Richard, *D.L.S.*, between blocks 'A' and 'B,' Indian reserves, for Louison Marcellais, Isaiah Buck and others. I was told by these parties that they had sold this land to Mr. Finger, for a site for a sawmill. Mr. Finger's agent told me that Mr. Finger had gone to Ottawa for the purpose of having the title transferred to him and would be back in about two weeks. I concluded to leave this survey until he returned.

I engaged four Indians to assist in the surveys, three of them at \$1.50 per day, and the other at \$2.00 per day, the latter to act as interpreter besides performing other duties. These wages included board, and was the current rate for such work in that district. Friday and Saturday being wet, we were not able to commence work until Monday, when we moved camp to Big Eddy and commenced the survey of that settlement, including the hay-lands along the south side of the Saskatchewan river. Most of the parties interested in this survey were away from home at the time, but

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the Indian agent, and Dr. LaRose, had consulted with them about the matter and advised me to proceed with the work. I surveyed the hay-lands, according to their wishes, into lots to correspond with the lots in the settlement survey.

I may say that there is no more land in the rear of the Indian reserve fit for lots, other than those surveyed. The soil is not fit for gardens even on the lots surveyed, there being little or no mould on the surface, which is pure gravel and sand. Part of the hay-lands in a dry season might be cultivated for gardens, the soil being sandy loam.

Mr. Henry Cook, who acted as spokesman for the Indians in this settlement, told me that they (the Indians) would like a timber reserve up Saskatchewan river. The timber on these lots is not large enough for building houses with. I told him that they would require to submit an application to the Department giving the location and extent of the reserve they wished.

The hay-lands in connection with this settlement are very suitable for growing hay, and are close to their lots.

I returned to The Pas and revised the survey of lots, now known as the Finger property, between blocks 'A' and 'B,' Indian reserves. Mr. Finger stated that he had purchased the rights of the Indians, and asked me what my instructions were as to the survey of the lots. I read them over to him, and he seemed quite satisfied with them. I asked him where he would like the road allowance laid out, and he told me to lay it out eight chains back from the bank of the river, across the lots and parallel with the river, and a road along each side from this road to the river. Mr. Finger stated that the Minister of the Interior had told him that he intended to have these lots of the Indians extend back a mile from the river, but he never asked me to lay out the lots to that depth. I inquired of the Indians how far they expected their lots to go back from the river, and they said to the back line run by Mr. Richard. I asked them how they were satisfied as to the depth and they signified that they were well satisfied. I therefore resurveyed the lots in accordance with your instructions, and those of Mr. Finger as to the position of the road.

I then surveyed a piece of ground on Pas river west of The Pas Indian reserve, for J. H. Gordon, merchant at The Pas. This land is low and flat, and subject to overflow from Pas river. The soil is sandy loam, and in a dry season would raise considerable grain and vegetables. This year being very wet scarcely anything matured.

I received a letter from Dr. Cash, M. P., the member for that district, asking me to make a survey up on Cormorant lake at 'the narrows', about fifty miles north of The Pas, for George Cowan and others. After finishing the survey of the Finger property, I went up to Cormorant lake and made three surveys, one for Mr. Cowan, one for the Hudson's Bay company and one for Mr. Presonias. These parties had made considerable improvements and had occupied this land for about eight years. The land had the best soil (a clay loam) but was underlaid with stones and gravel. The finest crop of potatoes and other garden produce that I saw during the summer grew there. The timber was chiefly spruce and poplar, some quite large, from twelve to eighteen inches in diameter, and fit for lumbering purposes.

I then returned to The Pas and made a survey on the north side of Saskatchewan river, adjoining The Pas Indian reserve, of a group of lots claimed by Zaccheus Umfreville and five others. Mr. Umfreville has been occupying his lot since June last. The others had not occupied the land, but had cut down some underbrush, &c. The Umfreville settlement lots cover all the land there fit for building upon. The land down stream is very low and wet, and in the rear, very swampy. The soil is shallow and stony. What the Indians seem to desire is a spot along the river to build a house and enough land to grow a few vegetables. They make no inquiries about roads to their lands. They consider that where they can launch their bark canoes on the water of the great Saskatchewan at their door, that they can travel wherever they please. I then made a survey on the south side of Saskatchewan river

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adjoining block 'B,' down stream. This is a group of lots claimed by Matthew Buck and five others. They had not occupied the land, but had lately cut down some underbrush. The lot is mostly swamp; a narrow fringe along the river is high enough to build dwellings on, but a short distance back it is wet, having about two feet of moss, with nothing but gravel beneath. Here and there, there may be little knolls of higher land, but of small extent. The timber is small, not fit for anything but firewood. There is very little more land on this side of the river fit for building upon.

I next made a survey of 'Birch Point' settlement, a group lot adjoining The Pas Indian reserve on the west, which had been occupied by Isaiah Young and four others, each of whom has a dwelling house erected thereon, and some clearing done. The land is somewhat higher and more rolling, with more clay and loam on the surface, but only in small areas, the main portion being stony and gravel subsoil. This high land runs some distance farther southwesterly along the Canadian Northern railway, and there is room for other settlements. The strip of high land is narrow between the railway and the marshy lake.

I also made a survey adjoining 'Birch Point' settlement for a group lot intended to be applied for by Louison Marcellais and others who had sold their land along the Saskatchewan to Mr. Finger.

I also made a survey of a piece of land adjoining The Pas townsite lying along Pas river for Louis Bacon, who had built a house and resided thereon for some time. It is mostly marsh, there being a narrow strip along the bank of Pas river, fit for cultivation, but scarcely high enough to build upon with safety from floods.

Game was plentiful, such as moose and other kinds of deer, bear, wolves and smaller animals. Fish in abundance is found in all the lakes and rivers and is of the best quality, such as whitefish, lake trout, sturgeon, jackfish and smaller varieties.

In the Pas district, game such as deer, bear, &c., are very scarce, but ducks, geese and all kinds of waterfowl are numerous. The season, from the time I arrived at The Pas, was very wet, with frequent heavy thunderstorms. The lakes, rivers and swamps were flooded, making the work in the low lands very disagreeable and somewhat dangerous. The first frost of the season occurred about the end of August, but was so slight that it did not affect the potatoes. During the first half of September there were occasional frosts, but not heavy; quite a number of gardens had not been affected very seriously, considering the wet season. The temperature was much milder than you would expect in that latitude.

As the season had been very wet and cold and showed prospects of an early winter, I concluded to leave for home at the first opportunity, having no other work in view. On the morning of Monday, September 16, the steamer *Marjorie* sailed for 'high portage' and my man and I took passage on her, arriving at Winnipeg on Monday, September 22, and at home on September 30.,

I have the honour to be, sir,

Your obedient servant,

LEWIS BOLTON, D.L.S.

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APPENDIX 17.

REPORT OF C. E. BOURGAULT, D.L.S.

RESURVEYS IN THE PROVINCE OF MANITOBA.

ST. JEAN PORT JOLI, March 6, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on resurveys made during the past season in the province of Manitoba.

In accordance with your instructions of January 10, 1907, to survey a fringe of marsh on the shores of lake Manitoba, I left home on January 17, arriving in Portage la Prairie on the 24th, having been delayed two days at Fort William by a snow-storm. The greatest difficulty was organizing a party and procuring the transport outfit, as the horses were at Gladstone and the sleighs at Oak Point, one hundred and fifty miles apart. I bought supplies and shipped them to Poplar point, where I hired two teams to take them to St. Marks in township 15, range 5.

The soil in this township may be ranked as third class, being composed of sand and gravel, but hay is plentiful and of first class quality. The settlers depend for their living on fishing in lake Manitoba in winter and on stock raising. As they earn good wages I had some difficulty in getting good men to work on the survey for the wages paid by the Department. The season was not suitable for this kind of work as there was too much snow and cold weather. I was in the field from January 17 to November 11, during which we experienced weather ranging from 45° below zero to 75° above. We suffered from cold during the winter as we were surveying in open country. During the summer we worked nearly all season in water from six inches to three feet deep, so that it is not to be wondered at if I was compelled to be continually hiring men. I have never seen such a severe winter and late spring; the ice was solid on lake Manitoba till June 10, and the summer was so wet that the men could not stand work more than a month.

These marshes are covered with long reeds from eight to twelve feet high. These had to be cut with scythes which made the work slow and tedious. After opening and chaining the lines I was compelled to haul on sledges posts about eight feet long and six inches square to mark the section corners in accordance with your instructions, often having to cut through four feet of ice before reaching the ground.

Settlers cut timber along parts of the sandy beach of lake Manitoba. This seemingly renders the shores lower at these parts, allowing the water to inundate good land on sections south of the lake.

About the end of March water covered the ice so that it was impossible to survey township 15, range 4. I accordingly moved my camp to township 18, range 4.

The township is suitable for stock raising. There is a creamery here and cream is shipped twice a week to Winnipeg where it commands a high price. Most of the settlers are Icelanders, who appear to neglect farming except raising vegetables and potatoes.

On May 17, I left this township for Sewell where I retraced the north boundary or Spruce Woods forest reserve. The surface of this reserve is composed of sandy hills and muskeg and is unfit for farm land. The timber has been completely cut or swept by fire.

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From Sewell I returned to Deer Horn on June 6, to make a retracement and restoration survey of township 21, range 5, and finding an error of five chains on the west side of section 6, I made a new survey of the whole township. Poplar and scattered spruce were found on every section. During a dry season hay is plentiful and of good quality, but irrigation is necessary to ensure a good crop. There is no cultivated land in the township. The soil is black loam with sand and gravel subsoil. The township is about one-third hay marsh, the remaining two-thirds being covered with poplar, spruce and willow.

From here I moved camp to township 22, range 6, and completed the retracement of this township on September 4. The settlers here are almost all of Swiss origin. The west part of the township is covered with thick bush consisting of poplar, eight to eighteen inches in diameter and scattered spruce twenty inches in diameter, while the east part is covered with young poplar, hay marsh, muskeg and lakes. There are no streams and the surface is so level that in wet seasons settlers are compelled to cut hay in the water. The soil is a black loam with sand and gravel subsoil.

I made retracements of townships 22, ranges 4 and 5, which were almost covered with water, and then retraced the Colonization road northwest to Teulon, which occupied us till October 31.

On November 1, I returned to Teulon, stored the outfit with Mr. W. McKinnell, paid off my party and started for home, arriving there on November 11.

I have the honour to be, sir,

Your obedient servant,

C. E. BOURGAULT, *D.L.S.*

APPENDIX 18.

REPORT OF P. A. CARSON, *D.L.S.*

TRIANGULATION SURVEYS IN THE RAILWAY BELT OF BRITISH COLUMBIA.

OTTAWA, March 1, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit for your consideration the following report of my field operations for the triangulation survey in British Columbia, in connection with the Trigonometrical Section of the Topographical Survey of Canada, for the season of 1907. This report is accompanied by a topographical map, on a scale of six miles to an inch, showing the whole triangulation in the Rocky and Selkirk mountains as it stands at present. The map shows also the topography of that part of the railway belt, British Columbia, which lies north of the Canadian Pacific railway, and west of Blaeberry river, that is, the districts drained by Blackwater creek, Bush river, Gold creek and Sixmile creek. The topography and the positions of the important features have been determined by means of triangulation, track surveys, photographs, and miscellaneous information, and names have been given to the principal mountains and streams.

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I left Ottawa on June 7, for Golden, British Columbia, where my outfit had been stored at the close of the previous season. My horses I found in excellent condition after a very severe winter in the Columbia valley, twenty-nine miles south of Golden. The horses had managed to forage very well in the sloughs along Columbia river, until the approach of spring, when the heavy crust on the snow prevented them from reaching the grass, and it was therefore necessary to give them chopped feed for several weeks. Considering the severity of the winter, which seems to have prevailed throughout Canada, and from some of the reports of the death of horses and cattle on the ranges in other districts, I was well satisfied with this vicinity as a winter range. I purchased two more horses in the Columbia valley at fifty-five dollars each, bringing the number of my horses up to eight.

It was found impossible to obtain skilled packers at the standard wage of two dollars *per diem*, so I was obliged to pay seventy-five dollars per month in order to secure a good man. The remainder of my party was engaged in Golden, only two of last year's quota being available.

BASE LINE.

I first visited the base line which was established during the season of 1906 in the Columbia valley, twenty-one miles south of Golden. The whole extent of the line was this year cleared out and prepared for final measurement, and the ends of the base were marked in a permanent manner, as described in your instructions.

At 'A,' the southerly end of the base line, which is situated in the northeast quarter of section 16, township 24, range 19, west of the fifth meridian, the end was marked as follows: The true end of the base line is an underground mark, being the intersection of a pair of fine lines in the upper end of a brass bolt, such as is used for marking the triangulation stations. This brass bolt is six inches long and three-quarters of an inch in diameter. It has a flat head one and one-half inches square and one-half inch thick. The bolt was firmly set in concrete, three feet below the surface of the ground (i. e. below the frost line). The head of the bolt was also marked with the letter 'A,' and the words 'End of Base, Canada.' The underground mark was covered with loose earth level with the original surface of the ground.

A set of four witnesses was securely placed in concrete, being iron reference bolts, each sixteen inches long, and three-quarters of an inch in diameter. A cross was marked on the head of each bolt, the centre of the cross in each case being three feet distant horizontally from the geodetic end of the base. These reference bolts bear respectively north, south, east and west from the geodetic point.

At 'B,' the northerly end of the base line, which is situated in the northeast quarter of section 35, township 24, range 20, west of the fifth meridian, the end was marked as at 'A,' except that the head of the bolt bears the letter 'B.' A set of four witnesses were also placed in a similar manner to that at 'A.'

It was deemed undesirable to place a permanent surface mark or monument over the ends of the base, as is generally done in geodetic surveys; but a temporary signal for observing upon was erected at each end of the base, being a triangular wooden pyramid three feet wide at the base, and three feet six inches high. The signals were covered with white cotton to assist in clearness of vision.

Each end of the base was accurately tied to the neighbouring survey posts of the Dominion system of survey, and a plot of ground, one chain square, is to be reserved at each end of the base for the purposes of the triangulation.

PROJECTION OF BASE LINE.

In order to project the base line of five and one-quarter miles extent, to the main triangulation, in which the sides of the triangles are from fifteen to twenty miles long, a set of three secondary stations was established, viz.: station 'C,' on Beaver-

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foot range, opposite the base line, station 'D,' on a wooded ridge on the west side of Columbia valley, opposite the base line and station 'E,' on the summit of Kapristo Mt. near the northerly end of Beaverfoot range. By means of these three stations the base line is connected with station '17' (Mt. King), station '20' (Beaverfoot) and station '21' (Spillimacheen) of the primary system.

STATION C.

Station 'C,' for the projection of the base line, is on the summit of the Beaverfoot range, at an altitude of about 8,000 feet. The mountain is easily reached by means of a pony trail running from Columbia valley wagon road, at a point near Biebernitz's ranch. This trail leads up the side of the mountain, and horses lightly packed may be easily taken to timber line. The station is marked with the usual brass bolt securely cemented in a hole drilled in the rock. The top of the bolt is stamped with the letter 'C,' followed by a triangle. The apex of the triangle is at the centre of the bolt, faces north, and is the geodetic point. Three reference bolts were also firmly cemented in the rock, each being six feet horizontally from the geodetic point, and bearing respectively north, south and west from it. Directly over the brass bolt a conical stone cairn was erected, four feet in diameter at the base, and six feet high. The cairn tapers to a point at the top, which is vertically over the geodetic point. White cotton was wound around the cairn to serve as a signal.

STATION D.

Station 'D,' for the projection of the base line was established on a wooded ridge on the west side of the Columbia valley, opposite the base line. The station is just south of the pass leading from Carbonate Landing to Spillimacheen valley. A spot on the ridge was cleared of timber so as to give unobstructed vision towards both ends of the base, and towards stations 'C,' 'E' and '21.' The station was marked by means of the usual brass bolt, cemented in a hole drilled in solid rock, twelve inches below the surface of the ground. The head of the bolt was stamped with the letter 'D,' followed by a triangle. The apex of the triangle which is at the centre of the top of the bolt, faces north and is the geodetic point. Directly over the geodetic point was erected a wooden signal, in the shape of a tetrahedron, five feet high. The signal was covered with white cotton to assist in clearness of vision.

STATION E (KAPRISTO MT.).

Station 'E,' the third station for the projection of the base line to the main triangulation, was established on July 10, on the summit of Kapristo Mt. (altitude 8,900 feet), one of the most northerly and highest peaks of the Beaverfoot range. The station was reached via an old smugglers' trail leading from Carbonate Landing to a high pass over the Beaverfoot mountains. At one time the trail led down into the Beaverfoot valley, but has fallen into disuse since the building of the Canadian Pacific railway and is impracticable for horses. From this pass above timber line the summit of the range was followed northerly until Kapristo Mt. was reached, overlooking the town of Palliser, on the Canadian Pacific railway. Angles were read towards station '17' (Mt. King), station '20' (Beaverfoot), station '21' (Spillimacheen), and stations 'C,' and 'D.' The station was marked in a permanent manner with the usual brass bolt firmly cemented in a hole drilled in the rock. The flat head of the bolt was stamped with the letter 'E,' followed by a triangle, with its apex at the centre of the top of the bolt. The apex of the triangle faces north and is the

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geodetic point. Directly over the geodetic point a conical stone cairn was erected five feet in diameter at the base, one foot at the top and six feet high. The top of the cairn is vertically above the geodetic point. Four reference bolts were also securely cemented in the rock, each being six feet horizontally from the geodetic point, and bearing respectively north, south, east and west from it. White cotton was wound around the cairn to act as a signal.

While we were on the summit of Kapristo Mt. establishing triangulation station 'E,' an electrical storm came from the northwest and we were soon enveloped in heavy dark clouds. A strange buzzing sound was heard, which seemed to proceed from our alpenstocks which we had placed in an erect position in the rocks. Then our faces commenced to tingle, as though swept by innumerable cobwebs, and our hair rose and fell from our scalps. A most peculiar tingling sensation pervaded our whole bodies and we looked at each other with half fear, half laughter on our faces, not knowing what to make of the situation. However, I decided to go ahead as though nothing strange were occurring and laid my hand on the metal of the theodolite. A sudden shock almost knocked me off my feet, and the smothered exclamation from my lips finished the oozing remnants of bravery which the others were displaying. In less time than it takes to tell it, all three were seeking shelter beneath some overhanging rocks fifty feet below the summit, and each one, I am sure 'searching his soul for sounds to tell how scared he was.' The storm, however, passed as quickly as it came and we resumed work at the station.

STATION 20 (BEAVERFOOT.)

On June 26, I visited station '20' in order to learn whether I could move it a little farther north and still see station '14' (Storm Mt.), and also to locate a suitable position for station 'E.' Even at this late day in June the snow of the past winter lay far below the timber line, while the peaks were so deep in snow that the cairns on Storm Mt. and Mt. King were completely invisible. I destroyed the markings for station '20' and subsequently erected a new station on the mountain immediately north of the old one. The markings for the new station are the same as before, except that only three reference bolts were placed. Each witness is distant six feet horizontally from the geodetic point and they bear north, south and west from it. The cairn is five feet in diameter at the base and eight feet high.

STATION 21 (SPILLIMACHEEN.)

Station '21' was established in 1906 on the peak where Mr. W. S. Drewry, D.L.S., had placed a cairn fifteen years before. It was afterwards discovered that the location was unsuitable for a triangulation station, as the cairn is invisible from any of the peaks in the vicinity of Battle Creek. Consequently in 1907 this station '21' was removed to a higher and more commanding peak a couple of miles westerly, in the same range of mountains. From the new station also a location for station '24' was determined upon, to take the place of the cairn called 'Battle Creek' and the magnificent mass of Mt. Sugarloaf was picked out. The mountain on which station '21' is situated may be reached either from the north or middle forks of Spillimacheen river, although probably the easier ascent may be made from the latter. If however it is desired to visit station '22' (north fork) directly afterwards, a saving of time is made by travelling via the north fork trail.

STATION 19 (MT. LAUSSEDAT).

The station established by Mr. W. S. Drewry, D.L.S. on the westerly side of Blaeberry river was afterwards discovered to be unsuitable for the continuation of the triangulation westward. Consequently in 1907 I destroyed station '19' (Blae-berry) as situated, and placed the station on Mt. Laussedat, altitude 10,000 feet),

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about three miles in a northeasterly direction from the old station. Mt. Laussedat is a high and prominent mountain commanding the Blaeberry and Waitabit valleys. The mountain may be reached from either of these although perhaps the more easily from the former. The ascent of Mt. Laussedat is by no means an easy one, for in the upper heights are several reaches of almost sheer rock. Our camp was placed on the left or east side of Blaeberry river, about fifteen miles from Moberly, and several miles above Blaeberry canyon and falls. Here we built a foot-bridge over a narrow part of the river, and with packs on our backs ascended a ridge leading northwest towards Mt. Laussedat. We bivouacked at timber line, and the following morning commenced the ascent of the main mountain. After some difficult rock climbing, and an ascent up an almost precipitous snow couloir occupying five hours from timber line, the summit of Mt. Laussedat was reached.

Station '19' is marked in the usual way with a brass bolt set in cement in a hole drilled in the rock. The top of the bolt is stamped with the Roman numerals XIX, followed by a triangle having its apex at the centre of the head of the bolt and pointing north. The apex of the triangle is the geodetic point. As reference marks there were drilled in the solid rock two holes, one due south of the geodetic point and distant six feet horizontally from it and the other due west of the geodetic point and four feet six inches horizontally from it.

Over a brass bolt a conical stone cairn was built, four feet in diameter at the base, one foot at the top and six feet high. The top of the cairn is vertically above the geodetic point.

While on the summit a snowstorm set in which made it exceedingly disagreeable and cold during the enforced stay at the top. The descent to timber line was made in four hours, being rather hazardous on account of the falling snow. Our trip up the Blaeberry occupied eight days, from July 15 to July 22 and five of these were rainy.

STATION 28 (BLACKWATER.)

Station '28' (Blackwater) is reached from the old town of Donald, on the Canadian Pacific railway by way of the Government pack trail from Donald to the Big Bend of Columbia river, and Tete Jaune Cache, near the Yellowhead pass. The trail crosses Waitabit creek by means of a bridge about a mile north of Donald, then follows a northwesterly course for four and one-half miles to a point on Bluewater creek about three miles from its mouth. A bridge crosses the Bluewater just where Blackwater creek falls into it, and the trail ascends Blackwater valley. The first three miles of trail are on the left or east side of the stream when the trail crosses and follows up the right bank for seven miles to a point opposite Blackwater lake. Here we descended on a branch trail to the level of the lake and camped at its southerly end. The lake is about one mile in length north and south, about three hundred yards wide and empties into Blackwater creek. Its elevation is 3150 feet. It teems with fine rainbow or mountain trout from six to eighteen inches in length. From Blackwater lake an old miners' trail leads northeasterly up Blackwater creek, coming from between the two most southerly mountains of Blackwater range. At timber line an old deserted mine is reached, from where the ascent to Blackwater Mt. is easily made in three hours (altitude 9000 feet.) This mountain is one of the highest peaks of Blackwater range and indeed of the district drained by Waitabit, Bluewater and Blackwater creeks. It commands an unobstructed view easterly towards Mts. Laussedat, Mummery and Freshfield, and northerly, across the Bush valley towards the lofty Lyell, Bryce and Columbia groups. To the south and west lies Columbia river, with the monarchs of the Selkirks beyond.

Station '28' is marked in the usual manner for primary triangulation stations with a brass bolt securely cemented in a hole drilled in the rock at the summit of the mountain. The head of the bolt is stamped with the Roman numerals XXVIII,

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followed by a triangle with its apex at the centre of the head. The apex of the triangle faces north, and is the geodetic point.

As witnesses there were set in cement three iron bolts, each six feet horizontally from the geodetic point, and bearing respectively east, south and west from it. A conical stone cairn was built with the centre of its base directly over the geodetic point. Its dimensions are six feet in diameter at the base, one foot at the top and seven feet six inches high. White cotton was wound around and securely wired to the cairn to serve as a signal.

Mosquitoes were very troublesome at Donald and all through Bluewater and Blackwater valleys, although at the lake we had a short respite from their onslaughts on account of the light breeze which generally blows down the lake. There is some excellent timber in Bluewater, Blackwater and Waitabit valleys, most of which is under license; there is also a quantity of low grade galena and copper ores.

STATION 29 (BUSH RIVER.)

From Blackwater lake the main trail continues for two and one-half miles to a low swampy pass (altitude 3,150 feet) and there swings to the easterly side of several small beaver lakes which form the headwaters of Succour creek, flowing northwesterly. For eleven miles the trail follows the right bank of Succour creek, finally striking Bush river crossing about a mile and a half in a straight line from the mouth of that river. This point may also be conveniently reached in canoes by descending Columbia river from Beaver mouth.

Bush river empties into the Columbia from the east, about twenty-two miles below Beaver mouth railway station. It is a glacial stream some two hundred feet wide near its mouth, flowing at the rate of three and a half miles an hour. During the months of July and August the river carries an immense quantity of water being fed by the large glaciers of Freshfield, Lyell, and Bryce groups. For a distance of three miles from its mouth the river flows in a westerly direction through low flat lands, which are mostly inundated during July and August by the high waters of Columbia and Bush rivers. Higher up, Bush river runs from the northeast with numerous side-channels flowing through shingle flats; the valley is about half a mile wide and the slopes of the mountain on each side are covered with dense spruce and fir timber. Bush river is navigable with canoes and small boats for a distance of thirty miles, although during the upper twenty miles poling must be resorted to, as the current from the mouth of Chatter creek (locally called Callahan creek) to the forks of Bush river is nearly five miles an hour. The whole of Bush river almost to the forks lies within the railway belt.

Owing to the low inundated lands of Columbia valley near the mouth of Bush river, and the numerous hay meadows and lakes up Bush valley, this vicinity is scourged with mosquitoes and black flies during the greater part of the summer. Messrs. Collie and Stutfield, who explored this district during 1900 thus describe it in their book 'Climbs and Explorations in the Canadian Rockies': 'The weather was now very hot and sultry and that evening swarms of the most voracious mosquitoes we ever encountered drove us nearly crazy. The men said they had occasionally seen them more numerous on the prairie, but that never in their lives had they known them anything so vicious or venomous. They lost no time in buzzing or fooling around, but went straight to business with their beaks until our faces and hands were one mass of bites . . . The night was a night of unending torment for at this lower elevation (about 2,500 feet) the insects do not go to sleep after sundown, as in the higher regions of the eastern Rockies.'

On the north side of Bush river near the crossing are two lakes, each about half a mile long, which I have named Cygnus lakes from the white swans that are generally to be seen upon them. These lakes are also the haunts of wild duck and geese in the autumn and besides teem with magnificent salmon trout, which are easily

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caught. In the river itself charr, ling and squaw fish are found. Black bears, are plentiful along Bush river, and goat on the mountains; a few marten, wolverine, coyote, lynx, caribou and white-tailed deer may also be found. There is no mineral of any account in this vicinity. It would be desirable to establish the limit of the railway belt up Bush river, on account of the valuable timber in the valley, and along the tributaries of the river, for at present there is great uncertainty amongst timber cruisers as to the exact position of the belt boundary.

Station '29' (Bush River) was established near the north limit of the railway belt on the summit of a mountain distant about four miles north of Bush river crossing. We placed our camp on the south side of the river at the crossing, where we found an old galvanized iron boat, which had been placed there by the provincial government for the convenience of travellers on trail. Crossing the river we set out with instruments and packs up a hog's back between the two Cygnus lakes. 'At timber line we set a fly-camp, and the next morning (September 24) we finished the ascent to the desired peak. The station was marked in the usual manner with a brass bolt cemented in a hole drilled in the rock. The flat head of the bolt was stamped with the Roman numerals XXIX, followed by a triangle with its apex at the centre of the head of the bolt. The apex of the triangle faces north and is the geodetic point. Four reference bolts were also securely cemented in the rock, each being distant six feet horizontally from the geodetic point, and bearing respectively north, south, east and west from it. Directly over the brass bolt a conical stone cairn was erected six feet in diameter at the base, one foot at the top, and nine feet high. The top of the cairn is vertically above the geodetic point. White cotton was wound around and securely wired to the cairn to assist as a signal. From station '29' a magnificent view is obtained to the north and east of those grand mountains of the main range, Mts. Columbia, Bryce, Alexandra, Lyell, Bush peak, Forbes, Freshfield and Mummery.

STATION 24.

During the season of 1906 a visit was made up Battle creek, a confluent of Incomappleux river, to establish station '24,' near where Mr. W. S. Drewry had set his 'Battle Creek' cairn in 1892; but it was found that no suitable location could be obtained to connect with station '21' (Spillimacheen) and station '22' (North Fork). I decided therefore that any attempt to extend the system of triangles across the summit of the Selkirks by sighting through a gap or gaps between the mountains would be futile and that it would be necessary to fix station '24' on one of the summit peaks of the Selkirk range, Sugarloaf Mt., was accordingly picked out as a desirable location, and a trip was made up the valley of Beaver river in order to ascend that mountain.

The horses and outfit were shipped from Donald to Bear Creek by rail, as there is no trail between these points, the railway here crossing many streams and rivers by some of the highest arches along the line. Bear Creek railway station is a flag station at an elevation of 3,670 feet, clinging to the side of the Hermit mountains along which the railway winds as it approaches Rogers pass. Some pickings of grass may be foraged along the railway track, but it is a dangerous spot for horses, it being necessary to herd the animals carefully in the daytime and tie them up at night to prevent accidents from passing trains. Consequently an immediate start was made from Bear Creek station (August 2) down the pack trail which leads to Beaver river, 800 feet below. About a mile and a half from the railway the trail crosses Beaver river by a bridge, then follows up the right (or east) bank of the river for a couple of miles, where it makes a turn up the north side of Grizzly creek. Here the trail branches, one fork ascending Grizzly creek to connect with the north fork of the Spillimacheen river, while the right hand trail crosses Grizzly creek by means of a bridge and ascends Beaver valley. The trail runs in a southeasterly direction along the east side of the river for about twenty-three miles to the head of the river.

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and crosses a low pass (altitude 4,700 feet) into the valley of the Duncan. Beaver trail is now in bad condition, being littered with windfall, necessitating the constant use of axes in order to make it passable for the pack horses. About six miles from the Grizzly bridge the first swamp or meadow is reached, where feed may be obtained for horses, then during the remainder of the distance there are many swamps and meadows, which however at high water make the trail very disagreeable for travelling, and it is an open question which is the worst, the swamps or the windfall.

As progress is made along the Beaver valley, openings in the dense forest allow occasional glimpses of the black and white precipitous mountains which line the western side of the valley. These rise to a height of over 10,000 feet, and their sheer dark masses form the easterly confines of the extensive Illecillewat and Deville *névés*; and I may add that this view of Mt. Sir Donald and the other majestic peaks of the Selkirks is much grander than that seen from the Canadian Pacific railway on the western slope. On the left or easterly side of Beaver valley Bald mountain lifts its long undulating height scarcely above timber line.

Beaver river, which rages and races through canyons and rapids in its lower reaches, soon becomes much smaller as its many glacial feeders are passed, until at the summit between Mt. Beaver and Mt. Duncan, the river commences its flow from the broad Beaver glacier, which extends its tongue into the very valley. Here, too, from the Duncan glacier only a short distance beyond, Duncan river takes its rise, flowing southward. About three miles from the pass or about twenty-three miles from Bear Creek railway station, one of the largest confluent of Beaver river, enters from the west, being a stream about fifteen feet wide, and only a mile long coming from the enormous Grand glaciers, which lie in the cold bosoms of Sugarloaf and Grand mountains.

Although Sugarloaf mountain seems to lie quite close to the pass, it is more easily reached via Grand glacier. Consequently we pitched our main camp on the bank of Beaver river, and taking instruments and packs ascended the south branch of Grand glacier to an altitude of 6,800 feet, where we bivouacked on a small timbered slope beside the glacier. The following morning we ascended the glacier to an altitude of 9,000 feet, making only slow progress over its rough icy surface and around its many wide crevasses. After climbing steadily for several hours the morning turned cloudy and fine rain and sleet commenced to fall. We soon realized that further advance would be but a waste of time so returned disheartened to our fly-camp. Then followed five days of steady rain, during which time the whole vicinity was shrouded with dense clouds, and we were never able to discern objects more than a hundred yards away. On August 19, it began to clear so the following morning before daybreak we once more attempted Sugarloaf. This time, however, instead of ascending the glacier we stuck to the rocky cliffs leading directly to the desired peak. After a steady but by no means difficult climb of six hours, almost entirely over ice and snow, we reached the summit (altitude 10,700 feet). A temporary cairn was erected for station '24,' but we could not set the permanent brass bolt on account of the depth of the snow. The descent to our fly-camp was made in four hours with many exciting glissades down almost precipitous snow fields. The next day we returned to our main camp in the Beaver valley.

Although the geographical position of Sugarloaf mountain is a good one for a triangulation station, it is not a perfect location by any means. Owing to the heavy precipitation in this locality, and the consequent enormous areas of ice and snow, glaciers and *névés*, it is only on rare occasions that a perfectly clear day can be obtained for observing and reading the angles necessary for triangulation work; while signals set on peaks in this district are also but rarely visible from adjacent stations.

From our camp near Grand glacier we returned to Bear Creek station in two days, although the trip in had taken over four days. The whole trip occupied twenty-two days, of which eighteen were rainy.

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There is some very fine timber up the Beaver and Duncan valleys, fir, spruce, cedar and hemlock. Large deposits of iron pyrites exist in the mountains on the west side; also some copper and traces of gold on the eastern side towards the head of Beaver valley. Game is somewhat plentiful, consisting of caribou, deer, marten, wolverine, and bear, while goats are numerous on the mountains to the west.

STATION 30.

That portion of the railway belt which lies north of Beavermouth and west of Columbia river had never up to this time been explored or mapped, so a visit was made into this district to establish triangulation stations and at the same time to prepare a topographical map of the country by means of triangulation, photography and track surveys.

Start was made from the Sixmile Creek railway siding, where the united north and south branches of Sixmile creek enter Beaver river from the west, about four miles from the mouth of the latter. Both valleys of Sixmile creek flow rapidly through narrow valleys between the mountains, and a route up either stream is impracticable for horses. Several years ago a prospector made a trail up the north branch for several miles, in order to tap some rich mica deposits which he had located and staked there, but nearly all traces of the trail have been obliterated by slides and fallen timber.

Between Columbia river and the north branch of Sixmile creek, a long ridge extends from the northwest, its southerly hog's back reaching in a point to the siding at Sixmile creek (altitude, 2,600 feet.) This ridge was swept by fire several years ago, and it now stands grey and black with the burnt remnants of once valuable timber. Up this long hog's back we cut our way through *débris* and *brulé*, the horses with light packs following slowly up the steep incline. After advancing in a northerly direction for about three miles an elevation of 6,000 feet was attained, and here the going was comparatively easy through the sparse timber and undergrowth of this altitude. Camp was pitched on a pleasant spot where the first water was found, the horses finding plenty of grass in these high lands. We continued our advance in a northeasterly direction through narrow passes at timber line, then along the level ridge termed 'The Esplanade,' on the westerly slope of the Esplanade range, lying between Sixmile creek and Columbia river. On our left the north branch of Sixmile creek lay several thousand feet below, while beyond rose some of the highest peaks of the Selkirks, 'Iconoclast,' 'Sorcerer,' 'Seraph,' 'Cherub,' 'Ventego' and 'Pearce.'

A secondary station No. '30A' was established on a peak of the Esplanade range, Cupola mountain, so called on account of the shape of its rocky summit. Angles were read, photographs were taken, and other information derived for topographical purposes. Advance was continued along the easterly slope of the north branch of Sixmile creek, and a gradual descent made to the head waters of that stream where we crossed a narrow snow pass, and reached the head of Spinster creek flowing northerly into Gold creek. From the pass we advanced for about a mile, dropping down several hundred feet, and pitched camp beside a small alpine lake, (Sunbeam lake).

Secondary station '30 B' was established on Sentry mountain (altitude, 7,500 feet), which is the most northerly mountain of the Esplanade range, and overlooks the mouth of Gold creek and Bush river valley.

From station '28' (Blackwater) and subsequently from Sentry and Cupola mountains, a high mountain since named Mt. Sandford, has been picked out as an excellent position for primary station '30.' This mountain lies near the north limit of the railway belt, in township 31, range 28, west of the fifth meridian, and is situated between Gold creek and Novelist creek. To reach this mountain, we therefore took packs on our backs (horses being of no further use), and crossed over a range

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of mountains to the west of our camp. We then descended some 4,000 feet into the valley of Bachelor brook or south branch of Gold creek, a rapid mountain stream about thirty feet wide. This creek flows through a narrow valley from the southwest and obtains its water from snow and ice in the very heart of the Selkirks, and empties into the main branch of Gold creek, about fifteen miles from the mouth of the latter. We made a difficult crossing over the swiftly flowing Bachelor brook, by means of an improvised foot bridge, and finding that progress was extremely slow through the dense timber along the banks of the creek, we ascended to timber line of Sonata mountain, the mountain lying between Bachelor brook and Gold creek. From Sonata mountain we soon discovered that we were still a long way from Mt. Sandford, and that that mountain, alas, was covered with fresh snow. We established a secondary station, '30 O,' on Sonata mountain (9,000 feet) then returned to our main camp, after an absence of five days, during three of which it had rained. A heavy snow storm now set in, which covered the whole district with nearly a foot of snow, so we returned to the railway at Sixmile Creek siding. A topographical map of that part of the railway belt in the vicinity of Gold creek and Sixmile creek has been prepared, with names for the important mountains and streams.

Gold creek enters Columbia river from the west, near the mouth of Bush river and is a rapid glacial stream, which during the months of July, August and September, carries an immense volume of water. Although a reconnaissance was made up Gold creek at the time of the preliminary surveys for the Canadian Pacific railway, no trail exists up the valley, which is at present impracticable for horses. There is much valuable timber up Gold creek, and its many confluent which has not yet been taken up. There is very little mineral of value in the vicinity despite the suggestive name of the stream. Rich deposits of amber and white mica exist all through the Selkirks from Sixmile creek to the 'big bend,' and although some claims have been staked and recorded, the mines have not been developed.

NOTES ON THE WEATHER.

The winter of 1906-7 which was such a severe one all over Canada was none the less so in the Rocky and Selkirk mountains, and the snowfall was especially heavy. The spring too was late and even in the last week of June, the snow still lingered below timber line. It was not until after the first week in July that the higher peaks became at all free from their many feet of snow, so that the cairns and signals of the triangulation survey were visible. After such a winter it was of course expected by all that the summer would make amends but in this we were greatly disappointed. Some very warm weather was experienced it is true, but on the whole the summer was the wettest for many years, the only compensation being the lack of forest fires which are generally such a curse, especially during the month of August. The mosquito pest was worse than usual, and we were troubled with that scourge from June until the end of September. Of course it must be realized that weather conditions are often judged from different view points, and that many days which are termed 'cloudy' by a mountain surveyor, are called 'fair' by residents of the valleys, for the clouds which obscure the mountain peaks and the surveyor's signals serve to make the days more pleasant to the sojourners in the valley.

During the latter half of June in Columbia valley there were nine fair days (all of which were very warm and sultry,) one cloudy day, and five days of rain. In the month of July, in Columbia, Blaeberry and Blackwater valleys we had fifteen fair, two cloudy and fourteen rainy days. In August in Beaver valley it rained on twenty-one days (with snow on the peaks) and of the remaining days six were fair and four cloudy. During September in the valley of Gold creek, and the vicinity of Bush river, thirteen days were fair, three cloudy and fourteen rainy, with some heavy snowfalls even at the low altitude of 5000 feet. The month of October was exceptionally

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fine in Columbia valley, being free from severe storms, and very little snowfall on the mountains. Although the reports on the weather give only four rainy and five cloudy days, the conditions were not suited to triangulation work. A heavy mist obscured the whole valley and the neighboring mountains every morning and it was unaffected by the rays of the sun until nearly eleven o'clock at which hour the banks of fog lifted only to cling tenaciously to the cold mountains. Then at four in the afternoon as the sun settled below the western hills the mist descended once more in a dense mass.

The water in Columbia river during the summer months was lower than usual, which goes to show that the amount of extreme heat especially in the early summer was less than in other years.

GENERAL NOTES.

The west boundary of Yoho Park reserve has recently been altered by Order-in-Council, and instead of following the meridian between ranges 19 and 20, west of the fifth meridian, from the summit of the Beaverfoot range to the south limit of the railway belt, it now runs southeasterly along the summit of the said range of mountains to the limit of the belt. This change throws open to settlers a goodly portion of fruit and farming lands, and already advantage has been taken of it by homesteaders and purchasers. At present only the bottom-lands in the Columbia valley are at all under cultivation, and but few attempts have been made to thoroughly test the possibilities of this district for producing the hardy and small fruits, although the results of most endeavors have been eminently satisfactory. Besides the bottom-lands, however, there is a large area of excellent bench-lands suitable for fruit farms extending back to the main mountains, but these lands will need considerable clearing, a task, however, which seems to require more energy than the easy going ranchers of the valley have at their disposal. A great portion of the said bench-lands is comprised within timber-berths, which have been stripped of their best timber, except that suitable only for railway ties. Should these lands be desired at any time for farming purpose they could be expropriated from the timber-berths without any serious loss to the lumber companies. However, until the much delayed Kootenay Central branch of the Canadian Pacific railway is constructed there will be very little activity in this district, either in agriculture or mining.

I have the honour to be, Sir,
Your obedient servant,

P. A. CARSON, D.L.S.

APPENDIX NO. 19.

REPORT OF WILLIAM CHRISTIE, D.L.S.

SURVEYS OF BASE LINES IN THE PROVINCE OF MANITOBA.

CHESLEY, ONT., March 27, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of my surveys during the season of 1907.

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On April 17 I received your instructions dated April 15, to survey the eighth base line across ranges 10, 11, 12, 13 and 14, and the ninth base line across ranges 10, 11, 12, 13, 14, 15, 16, 17, 18 and part of 19 all west of the principal meridian.

I was delayed in starting for the work owing to the fact that the six-inch transit which I had ordered from the Department did not arrive until May 27.

On May 29, I left Chesley and on June 1, arrived in Winnipeg, where I was to organize.

On June 6, I went to Winnipegosis and purchased a sail boat as instructed. I also purchased five pack horses.

On June 8, I returned to Winnipeg and on the 10th went to Teulon, where I disposed of the wagon, buckboard and harness belonging to the outfit used by me last year. The rest of the outfit, together with two additional horses purchased at Teulon, I shipped by rail to Winnipegosis in charge of a member of my party.

Returning to Winnipeg I completed the organization of my party and left on the 13th for Winnipegosis, where we pitched camp on the 14th.

We were delayed here until the 21st waiting for the boat to be rigged and for supplies to arrive from Winnipeg. We would scarcely have been able to start earlier even had we been prepared, as the lake was not clear of ice until about that date. On that date, however, having sent five men across country with the pack horses, we loaded the outfit and supplies on the boat and proceeded across lake Winnipegosis, down Waterhen river to Waterhen lake, and thence continued down Waterhen river to lake Manitoba. We met the pack horses at a ranch on the west shore of lake Manitoba on section 16, township 29, range 15. Here we left the boat and most of the supplies, and moved with pack horses to the northeast corner of township 28, range 15. From this point the line was run easterly across ranges 14, 13 and part of 12 to the western shore of lake Manitoba.

This portion of the line was completed on July 8. As I had no further need of the horses on this line, I sent two men to take them down to The Narrows in anticipation of having them taken by steamer to Gypsumville, which was the most convenient point to the northeast corner of township 32, range 10, at which point the survey of the ninth base line was to be commenced.

On July 9, having had the boat brought around to the line, we crossed the lake and camped on the east shore in township 29, range 10. I found that the portion of this line across range 10 as far as the east shore of the lake had already been surveyed.

On July 10, I went to Gypsumville and arranged with the Manitoba Gypsum company to have the horses taken across the lake to Gypsumville by one of the company's steamers. I began the survey of this portion of the eighth base at the northeast corner of section 33, township 28, range 10. By July 24, the line was completed across ranges 10 and 11 and connection made with the portion of the line on the west side of the lake.

On July 25, I started for Gypsumville with the outfit. Arriving there on the 26th I found that the horses had not yet arrived. They reached there on the 29th and on the 30th we left Gypsumville. On August 2, we camped on section 1, township 33, range 10, and began the survey of the ninth base line at the northeast corner of township 32, range 10.

I used pack horses to move across ranges 10, 11, 12 and 13, as far as Boggy creek, which crosses the line in section 35, township 32, range 13. From here to the end of the line I used the boat exclusively for transporting the outfit and supplies, the country through which the line passes being so swampy as to be almost impassable for horses. At some time it was with difficulty that the horses, without loads of any kind, were kept up with the camp. The horses also suffered greatly from swamp fever and foot-rot; so much so that up to the time of completing this line, five of them died. Considerable time was lost in moving camp, cutting roundabout trails to avoid swamps while moving with horses, and on account of the roundabout route to be taken when moving by boat on the lakes and rivers. When I reached the east shore of lake

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Winnipegosis I left the horses in the care of Mr. Adam, rancher and fisherman, until the completion of the line on September 25.

I then crossed the lake and ran the line east from the northeast corner of section 32, township 32, range 19.

On October 8, I completed this line by connecting the two portions across lake Winnipegosis. The error in longitude of closing across the lake was 17.82 chains.

On October 9, I returned to Winnipegosis and received your instructions to survey the tenth base line easterly across lake Winnipegosis to the east boundary of range 15, the principal meridian across townships 26, 27 and 28 and the eighth base line across ranges 1, 2, 3, 4 and 5. I made inquiries regarding the time at which navigation usually closed on the lake, and the nature of the country adjacent to the lake, through which the tenth base line would pass. From the information received I concluded that it would not be advisable to attempt to make the survey of the tenth base line at that time. I telegraphed you accordingly, and in reply was instructed to proceed with the survey of the principal meridian and the eighth base line.

I accordingly shipped the outfit by rail to Teulon. Here I purchased three wagons, three sets of harness and another horse, with which to move the outfit and supplies out to the starting point, a distance of about seventy miles by the route taken. This route followed the colonization road from Teulon to Icelandic river. The trail crosses Icelandic river in township 23, range 1, east of the principal meridian. From here a trail leads north across townships 23, range 1, east of the principal meridian, and 24 and 25, range 1, west of the principal meridian, to Fisher river, where some settlers have located in township 25, range 1, west of the principal meridian. The roads were in such condition, owing to the unusually wet summer, as to be almost impassable. And I found that the loads were altogether too heavy for the horses I had. Having got as far as township 21, I hired a team of horses and two teams of oxen, thus reducing the loads for each team by one-half. On October 31, we reached the settlement mentioned above and the freighters returned home.

From here we cut a road to the meridian and camped on section 12, township 26, range 1, west of the principal meridian. In cutting this piece of road we had to make a wide detour to avoid swamps. On November 5, I began the survey of the principal meridian at the northeast corner of township 25.

When I reached Fisher river with the survey, the horses were in such a condition that I saw clearly that they would not be able to endure the remainder of the survey, as it was impossible to provide proper food in sufficient quantities along the lines. Two of them had already died since commencing this line. I therefore decided to resort to man packing for the remainder of the survey. I left the horses and as much of the outfit as possible in care of Mr. E. Rogers, who has a ranch on Fisher river, in township 28, range 1, west of the principal meridian. I then began the survey of the eighth base line, which I completed on December 28.

I had previously arranged to have some Indians come in with dog trains to move the outfit back to Fisher river. They arrived at the camp with five dog trains on the 29th and on the 30th we started for Fisher river, where we arrived on the 31st.

As there was now about a foot of snow on the ground, I thought we would be able to travel much faster with sleighs than with wagons. I therefore exchanged one of the wagons for two sets of bobsleighs. I also hired another team to help move the outfit back to Teulon, where we arrived on January 9, 1908.

I stored the outfit with W. C. McKinnell, of Teulon, who also contracted to winter the remaining six horses. On the following day I returned to Winnipeg, discharged my party, and arrived in Chesley on January 14.

Throughout the whole of the region traversed during the season's operations good water was found in abundance, much of the country surveyed being under water at the time of the survey. Practically the whole of the region traversed is too low and wet for farming purposes without considerable draining. Big game, parti-

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cularly moose, is plentiful throughout the whole of the region traversed. Some jumping deer were also seen on the east shore of lake Manitoba on the eighth base line. No minerals of any kind were noticed along the lines surveyed, but gypsum is mined quite extensively in township 32, range 9, west of the principal meridian.

I have the honour to be, sir,

Your obedient servant,

WM. CHRISTIE, *D.L.S.*

APPENDIX No. 20.

REPORT OF T. A. DAVIES, *D.L.S.*

SURVEYS IN CENTRAL ALBERTA.

OTTAWA, FEBRUARY, 28, 1908.

E. DEVILLE, Esq., LL.D.
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report concerning the survey work done in the Edmonton and Lloydminster districts during the season of 1907 in accordance with instructions issued to me on April 16 and September 17, 1907.

On April 17, I left Ottawa for Edmonton and having arrived there proceeded to organize a party for the season's work. This done we left Edmonton and drove to Wetaskiwin; thence we followed the Wetaskiwin and Hardisty branch of the Canadian Pacific railway to a short distance east of Gwynne, where the trail left the railway going in a southeasterly direction through Rosenroll; thence following Battle river and passing through Heather Brae we arrived in township 44, range 19 west of the fourth meridian on May 5.

At this time snow lay on the ground from one to two feet deep and during the first week owing to snow storms work was considerably delayed. After that the snow began to disappear rapidly and weather conditions became favourable for work. This section of the Edmonton district is well settled and opened up with well travelled trails and surveyed roads. Along many of the section lines grading has been done and small bridges built by the settlers.

In each township schoolhouses have been built and are well attended. On Sundays church services are held in them. There is a weekly postal service, the post offices being conveniently placed throughout the district. In connection with the post office there is in most cases a general store to supply the settlers with their several wants.

The country is broken by Battle river valley averaging three-quarters of a mile in breadth, with slopes from one hundred to one hundred and fifty feet in height. The river itself, generally, is two chains wide, varying from two to ten feet deep during the summer season, with a current of approximately two miles per hour. It flows in a southerly direction through this section of the country.

On each side of the valley the country is a first class farming district having an undulating surface with clumps of poplar and willow bush. The clumps of poplar and those of spruce, tamarack and some birch which are thickest in Battle river valley and in Meeting creek and Willow creek valleys, make a sufficient supply for fuel, fencing and building purposes, but are not of large enough extent for lumbering.

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The soil is generally a sandy loam with a clay subsoil, and in some parts a rich black loam.

Coal, which is deposited in pockets along the slopes of Battle river valley is used to a small extent for fuel by the settlers, but it is not in sufficient quantities for mining purposes. Other minerals were not seen. The water is pure and the supply plentiful.

In section 18 of township 41, range 16, west of the fourth meridian there is a small fall of about ten feet on Battle river and this is the only water-power in the district.

Good wild hay is obtainable throughout this country and grows luxuriantly in many parts of Battle river, Meeting creek and Willow creek valleys.

Good crops of wheat, oats and flax are harvested and these are the chief products, although potatoes and all vegetables ordinarily used, are grown successfully.

Cattle ranching, owing to the large number of settlers, is carried on in very few parts and in a small degree.

The settlers are composed largely of men from the United States and eastern Canada with a considerable number of Norwegians and Swedes and a comparatively few Englishmen.

Frost came for the first time during the season about the middle of August, but it was understood from the settlers that this was unusually early.

The chief game in the district is duck. There are a few prairie chicken, coyotes and lynx.

Having completed the work in this district on October 1 we drove to Bawlf on the Wetaskiwin branch of the Canadian Pacific railway and from there shipped the outfit to Edmonton and thence by the Canadian Northern railway to Lloydminster. From this place we drove along the mail trail northeasterly to Hewitt Landing post office on the south bank of Saskatchewan river. Here we were ferried across the river and proceeded about five miles down stream to a suitable camping place in township 53, range 26, west of the third meridian, where we were to do retracement and restoration work in accordance with the instructions of September 17.

That part of the country in township 53, range 26, west of the third meridian and north of Saskatchewan river is rough and sandy and broken with small lakes, sloughs, marshes and muskegs. Pipestone creek, which flows southerly along the east boundaries of sections 33 and 28 and here enters Saskatchewan river, divides the north part of the township into two parts by the rough and wooded coulée through which it flows. To the west of this creek large clumps of poplar, spruce and tamarack from two to ten inches in diameter almost cover the country. To the east is rolling with scattered clumps of poplar and willow bush. Farther to the east in ranges 25 and 24, the country becomes higher, and is covered with willow bush and poplar from two to twelve inches in diameter.

The soil is a light sandy loam with a clay and sand subsoil. The water in the creeks is good and pure, but in most of the sloughs and lakes alkaline. Good wild hay grows abundantly, especially along the valley slopes.

Settlement had not crossed the Saskatchewan, but settlers were scattered along the southern slope of the valley. They had grown wheat and oats in small quantities, and owned some few head of cattle. As far south as Big Gully creek which crosses the northeast corner of township 50, range 27, and the southwest corner of township 50, range 26, settlement is in an early stage. The settlers had apparently been in the country but a short time, houses and shelter for cattle were being built, pieces of land ploughed and small crops of grain harvested. Most of the settlers are English.

The country is hilly with scattered clumps of second growth poplar and willow brush. The small lakes and sloughs which are numerous are very often alkaline. The soil is a sandy loam with a clay subsoil.

Game consists principally of duck and prairie chicken. There are also some coyotes and muskrats. There was no indication of minerals.

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Fuel can be obtained in small quantities from the scattered clumps of poplar. The larger poplar timber lies mostly along the banks of Saskatchewan river.

About November 1 the sloughs and small lakes began to freeze over and by the middle of the month the frost began to settle in the ground, so that by the end of the month the digging of pits became a slow and difficult part of the work. Consequently having received instructions to close the season's operations when these conditions came about, we stopped work on December 2, drove to Lloydminster and shipped the outfit to Edmonton where having made satisfactory arrangements with Mr. Angus McDonell, of Ray, Alberta, for wintering the outfit, I placed the same in his charge and left Edmonton for Ottawa, where I arrived on December 11.

I have the honour to be, sir,

Your obedient servant,

T. A. DAVIES, *D.L.S.*

APPENDIX No. 21.

REPORT OF W. J. DEANS, *D.L.S.*

SURVEYS IN SOUTHERN SASKATCHEWAN.

BRANDON, February 24, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on my surveys in Saskatchewan during the season of 1907.

On May 12, I received your instructions directing me to make a retracement and restoration survey of township 21, range 1 west of the second meridian, and township 24, range 30, west of the principal meridian.

I also received instructions on the same date to sell a horse which had been left at Oak Point. I tried to dispose of the horse by corresponding with some parties, with whom I had some acquaintance, but failed. It was, therefore, necessary for me to visit Oak Point. I found the horse in a very poor condition, but after a great deal of effort I succeeded in selling him at what seemed to be a good price.

On my return to Brandon I expected that a letter containing the usual advance would be awaiting me, as the instructions stated that such would be mailed in a few days. It was June 8, when the advance reached the Bank of Montreal.

On June 12, I left Brandon for Saskatoon to take over an outfit which had been left at this place by Mr. W. R. Reilly. I found the light horses, which had been wintered by Mr. J. McNeil, in splendid condition, although the winter had been most severe and hay exceptionally scarce. It was a source of great pleasure to me to meet a man who had carried out his agreement in such a satisfactory manner. A large portion of the outfit which was stored with Mr. J. F. Cairns, Saskatoon, was destroyed by fire. It was consequently necessary for me to replace the parts required before leaving Saskatoon. This unforeseen occurrence delayed me two days.

On June 17, I obtained a car from the Canadian Northern Railway company and shipped the outfit to Canora at which place it arrived on June 21. Owing to the severity of the winter and the great snowfall, the roadbed of this railway was in a bad con-

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dition in many places and derailments were quite frequent. I was much relieved when the car arrived containing the outfit and man without any serious mishap.

From Canora I went by road to Yorkton arriving there on June 22. My instructions were to organize the party at this place. I had not been in Yorkton since 1899, and my recollections associated it with a collection of shacks. I was surprised to find it a place of such size and importance and began to realize the possibilities of this western country. Two days were required to organize the party and get supplies so that it was not until June 25, that I got started for township 21, range 1, west of the second meridian, the scene of my first work.

The country between Yorkton and this township is well settled in places and contains many fine cultivated farms, and buildings equipped with all appliances for successfully carrying on farming operations. The houses contain conveniences which one would hardly expect to find in such a new country.

The original survey of township 21, was made in 1880 and many of the corners were marked with wooden posts and bearing trees which in most cases had disappeared and now that the township had become well settled it was necessary to retrace the lines and restore the monuments so that roads could be constructed and fences placed on the correct lines. Most of settlers signed the necessary petition enabling me to do this work and appeared pleased when it was completed.

The Polar Star Ranching company own a number of sections in this township and had quite a large force of men engaged in cleaning the land and placing it in a state fit for cultivation. The old settlers have waited long and patiently for a railroad and are elated over the prospects of their expectations being realized. The Canadian Pacific have surveyed a line which runs from Esterhazy to Bredenbury and passes through the centre of the township. It is thought that this line will be constructed at once. The Grand Trunk Pacific have also constructed their main line about two miles south of this township so that the settlers will have railway facilities which will enable them to market their produce to great advantage.

I completed the survey of township 21 on August 2, and next day started for Saltcoats. While in this vicinity I investigated a claim in reference to a lake located on the northeast quarter of section 11, township 24, range 2, west of the second meridian. I found that the lake was one the area of which should be deducted according to the provisions of the Manual of Survey and accordingly traversed it.

On August 6, I started for township 24, range 30, west of the principal meridian, arriving at the northwest corner the same day. We erected our tents and made preparations to start to work next day. This township was subdivided in 1882 and in 1902 a restoration survey was made, the surveyors reporting serious errors in the original survey. My instructions were to correct these errors if possible, and retrace all lines. I found it impossible to make any corrections owing to the numerous complications, but retraced all the lines and restored the monuments. The plan of this township furnished me showed a lake having an area of about 160 acres, located on sections 25 and 26. I was much surprised to find that no such lake existed, the site being mostly high and dry prairie. There are quite a number of Galicians settled in the northwest corner of this township, where the most serious mistakes occur, but I found that Galicians were much like other nationalities, the desire to have the errors of survey corrected extending only to the man with the small homestead. The work was seriously retarded in this township by the extraordinary wet weather which prevailed throughout August. The want of railway is greatly felt by the settlers in this part.

I intended to go south after finishing my work in township 24 to carry out your instructions contained in a letter dated July 4, but a telegram received on August 29, stated that surveys were required of Doukhobor villages near Buchanan and that I was to communicate at once with Michael White, Doukhobor interpreter. I telegraphed Mr. White that I would try to be at Buchanan on September 5, but owing to the wet weather and the impassable condition of the roads, I did not reach Buchanan until September 10, at which place I was further delayed two days so that it was

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September 12, before I arrived at the Doukhobor village of New Gorilloe, in township 32, range 6, west of the second meridian. My instructions in reference to the survey of the Doukhobor villages stated that I was to be guided by information contained in a letter of the secretary of the Department, dated August 15, and the suggestions of Michael White, Doukhobor interpreter. The villages were to contain twenty acres and where not on sectional road allowances were to be connected by roads from the village site. I first surveyed the village of New Gorilloe, giving it an area of twenty acres including a road. I also surveyed a road one chain wide, starting from the northeast corner of section 5 and running easterly in a straight line to the northeast corner of section 4. Over this road the Doukhobors and public living to the west will be enabled to reach Buchanan by a short and good route.

My next work was to survey the village of Kyrillovo, situated on section 7, township 32, range 6, west of the second meridian. This village has an area of 20 acres, including a road connection.

I next surveyed the village of Moirayovo, situated on the west half of section 21, township 31, range 6, west of the second meridian. The village has an area of 20 acres. This village being near the centre of the section, it was necessary to give them an outlet, and accordingly I surveyed a road a chain wide, starting at the quarter-section post in the east boundary of section 20 and running easterly to Spirit creek, where I made a diversion in order to get the best and most economical site for a bridge. Shortly after crossing the creek the road again assumes its original course and connects with a road which I surveyed through the Doukhobor village of Resbehileovo, thence on to the meridian road allowance east of section 23. This road will allow the Doukhobors living to the west, south and east an outlet to Buchanan which can be travelled at any season of the year, made possible by the construction of a bridge across Spirit creek. The settlers and people of Buchanan greatly appreciate this road.

My next work was to survey the village of Ootishennie, situated on the southwest quarter of section 31, township 30, range 5, west of the second meridian. This village has an area of twenty acres and is situated near Patterson lake. On September 28, I started to survey the village of Kalmakova, situated on the southeast quarter of section 31, township 30, range 5, west of the second meridian. I surveyed a road southerly from this village to the sectional road to the south. The area of this village, including a road running through the centre, is twenty acres. I next surveyed the village of Old Gorilloe, situated on the northeast quarter of section 17, township 30, range 5, west of the second meridian. The area of this village, including roads, is twenty acres. The inhabitants of this place are all independent Doukhobors and are divided into two bitter factions so that Mr. Michael White and myself found it impossible to reconcile the discordant elements. We accordingly laid out the village and roads in a way by which we considered all parties would be equally benefitted. There is a public school in this village. We surveyed two acres as a site for the school. The Doukhobors do not take advantage of the facilities offered to obtain an education, there being only one Doukhobor present on the two occasions when I visited the school.

On October 9, in company with Mr. Michael White, I left Buchanan for the Doukhobor village of Novoe. It was reported by the Doukhobors that the houses in this village were on the road allowance and on this account they wished a road diversion. I ran the east boundary of section 14 and found that the houses were not on the meridian road allowance, and that to divert the road as the Doukhobors wished would close up the only ford on Whitesand river for a considerable distance and would doubtless inconvenience the public who might have occasion to use this road. We therefore refused to make any diversion.

On Saturday, October 12, I arrived at the Doukhobor village of Pakrofka, situated on the northeast quarter of section 28, township 30, range 1, west of the second meridian. I surveyed this village, giving it an area of twenty acres, including two connecting roads. One of these roads is a chain wide and is taken off the southerly

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part of the northeast quarter of section 28, township 30, range 1, west of the second meridian, and runs the whole width of the quarter section and in an easterly direction, connecting the village with the road allowance to the east; the other road is fifty links wide and runs from the road allowance north of section 28 southerly through the village.

While surveying the Doukhobor villages I noticed the supreme authority Peter Veregin had over the community and the use he made of his power. I know little about the religion or creed of the Doukhobors, but it appears to me that they do not observe very strictly that code of morality common to all Christian sects.

My work was greatly retarded by rain in September. I found Mr. White thoroughly conversant in all matters pertaining to the Doukhobors and deeply interested in all that concerned them. It was a great pleasure for me to be assisted by him in this work.

On October 16, I left Pakrofka for Frame lake, having received instructions in September to traverse that portion of the lake which extended into township 34, range 3, west of the second meridian. I arrived at the lake on October 19, and completed the traverse the same day. From Frame lake I started for Invermay by way of Buchanan to investigate the necessity of traversing two lakes situated in township 32, range 8, township 32, range 9, and township 33, range 9, west of the second meridian. I retraced some of the lines in townships 32 and 33, range 9, placing traverse points on the lake shore. I extended the east boundaries of sections 28 and 33 to Saline lake. I decided it would be better to wait until these lakes were frozen before attempting to traverse them, as there was a thick growth of poplar and a peculiar stone wall around the lake in many places.

On October 28, I started for Kamsack to retrace the boundaries of a parcel of land situated in the northeast corner of Côté Indian reserve No. 64, and to make a traverse of Whitesand river from the second meridian to its junction with the Assiniboine river, also to retrace the west boundary of Côté Indian reserve No. 64, and subdivide any unsubdivided land east of the reserve. I arrived at township 30, range 31, west of the principal meridian on November 2, and started to retrace the boundaries of a parcel of land referred to in your instructions as being in the northeast corner of the Côté Indian reserve, No. 64. I found that the subdivision within the reserve did not agree with the work which had been done previously to the east, there being a jog of nearly 10 chain in the roads running east and west. I traversed the easterly boundary of the reserve and found that there was a deflection to the west but not as much as that which appears on the township plan. I found a small piece of land east of the reserve which had not been subdivided. I extended the lines through this to the reserve. In township 29, range 31, west of the principal meridian I retraced the east boundaries of sections 33 and 28 and the north boundaries of sections 21 and 28 re-establishing the corners. I also retraced the south boundary of Côté Indian reserve, No. 64, and connected this with the subdivision to the south.

On November 16, I started to retrace the lines in township 30, range 32, which crossed Whitesand river, placing traverse points in the centre of the river. I completed the traverse of the Whitesand on November 29. On December 2, I with the party, took the train at Kamsack for Ivermay to traverse Saline and Stonewall lakes. I completed the survey of these lakes on December 7, and on the 9th returned to Kamsack where I found your instructions in reference to retracing the south boundary of Côté Indian reserve, No. 64, and connecting it with the subdivision to the south. I completed this last work on December 11, and on the 12th I paid off the party, stored the outfit and made arrangements to winter the horses. I arrived back in Brandon on December 14. Not having any assistant I thought it better for me to do the larger pieces of work as I found moving a large party slow and cumbersome, taking up too much of my time.

The weather in June, July, August and part of September was very wet making travel slow and unpleasant, also seriously interfering with the work.

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The wheat crop throughout the part of Saskatchewan in which I was working turned out poor, but oats and barley did very well. I noticed a great deal of new breaking throughout the part in which I was engaged, the crop conditions not affecting adversely the spirits of the settlers.

I have the honour to be, sir,
Your obedient servant,

W. J. DEANS, *D.L.S.*

APPENDIX No. 22.

REPORT OF L. E. FONTAINE, *D.L.S.*

TRAVERSE OF MILK RIVER IN SOUTHERN ALBERTA.

LEVIS, QUE., March 23, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report of my field operations, during last season, on the course of Milk river, in southern Alberta, performed in accordance with your instructions dated April 10, and those of subsequent date relating to subdivision of part of township 4 range 6 west of the fourth meridian.

On receipt of your instructions, I proceeded to Ottawa, where I remained two days, in order to procure additional information for the carrying out of the survey operations during the summer, I then left for Edmonton, Alberta, where I arrived on April 29.

My object in going to that point was to forward south the outfit stored there during the previous winter, and to secure the services of my men of last year who would be willing to hire for a second season, and also, if possible, engage the full complement of labourers required, as I was well aware from past experience that I would not be able to engage the required number in the district where I was to operate. I was fully successful in this, and on May 3, I left for Calgary.

On May 6, the men arrived from Edmonton and on the 8th, they left for Lethbridge by way of the Calgary and Macleod trail, and on the 14th arrived at their destination. I had preceded them by train, and occupied the few days at my disposal completing the organization. On their arrival, everything being in readiness, we proceeded on our journey to the international boundary by way of Cardston and Taylorville, and on May 27, camped on the southeast quarter of section 8, township 1, range 23, west of the fourth meridian.

For a few days following my arrival at the starting point, on account of the high winds and prevailing rains, I was obliged to postpone operations; eventually, conditions becoming favourable, the work was proceeded with and carried out successfully and uninterruptedly.

In order to act in accordance with your instructions and carry out effectively the two distinct survey operations called for therein, I proceeded to traverse the river, using the stadia method during two successive days, and on the third day, while a squad of men would be moving camp, I gave my attention to the line of levels.

This mode of procedure, in my estimation, was the only way that these two operations could be carried out simultaneously, without any loss of time, and the result achieved is an evident proof in this respect.

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The course of the river meandering across ranges 5 to 23, was considered too great a distance in longitude to refer all bearings to the same meridian; therefore, the following division was made:—

1. From station 1 to station 322 all bearings are referred to the central meridian of range 23.

2. From station 322 to station 688, all bearings are referred to the central meridian of range 17.

3. From station 688 to station 919, all bearings are referred to the central meridian of range 11.

4. From station 919 to station 1101, all bearings are referred to the central meridian of range 7.

With reference to the line of levels, it may be noted that from the starting point, following the north branch of the river and proceeding easterly to the forks, a difference of six hundred and twenty feet in elevation was observed over a distance of sixty miles, or an average fall of a fraction over ten feet to the mile.

On the south branch from the forks in a southwesterly direction to the international boundary a difference of two hundred and ninety-six feet in a distance of twenty-five miles was observed, or an average fall of nearly twelve feet to the mile.

From the forks easterly to the international boundary in range 5, a fall of eight hundred and fifty-four feet in a distance of one hundred and fifty-five miles was noted, or a drop of five and a half feet to the mile.

The line of levels was carried on throughout the entire traverse, and at every half mile, when practicable, the elevation of the river bank above the water line was noted.

The elevation used at the starting point is that given for bench mark No. 53, mentioned in the report, 'Irrigation in the Northwest Territories of Canada, 1902,' by J. S. Dennis, Deputy Commissioner of Public Works.

Connection was also made with permanent bench marks Nos. 288 and 290, of the above-mentioned survey.

As requested, section iron posts marked T. H. (traverse hub) on one side, and B. M. (bench mark), with a crow's foot (A) on the other, were placed on all township outlines intersected by the survey, and the elevation of each will be found in the note books.

A permanent bench mark with a stone cairn was established on the north bank of the river in range 5, opposite the mouth of Kennedy creek. This was considered a more favourable place for establishing it than at the end of the traverse, as first intended. Owing to its proximity to a well known ford of the river and the location of Kennedy creek being known throughout this section, this bench mark can be easily identified.

The course of Milk river is in a well defined valley, bordered on each side by a range of hills, in which its sinuous course forms intermittent flats of more or less extent.

From the international boundary, in range 23, easterly to the east half of range 15, the elevation of the banks above the mean water level is not of a very great height and during heavy prevailing rains the flats in the section are in many places flooded, and the effects of erosion are everywhere evident. In the east half of range 15 and the west half of 14 the river runs through a series of canyons and small gorges.

From here to range 6 the stream meanders in a valley twice the size of that at the head waters. In range 6 and the greater portion of 5, the river flows through what is commonly known as the 'bad lands.' This, I may say, is not a very inviting spot, as it is an agglomeration of broken hills of various heights which bars access to the stream. In the remaining part of range 5 it resumes its normal course.

The south branch presents very nearly the same general topographical features, except that it carries a greater volume of water and has a swifter current.

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Except in ranges 5 to 8, where a few poplar, cottonwood and willow are to be found on some of the benches, the remainder of this valley is absolutely void of timber. On the other hand, any quantity of building stone can be obtained throughout almost its entire course.

* * * * *

On the completion of the operations on Milk river, I attended, as requested, to the subdivision of part of township 4, range 6, west of the fourth meridian, and when this was carried out, I left for Calgary, where I discharged the party.

I have the honour to be, sir,

Your obedient servant,

LOUIS E. FONTAINE, *D.L.S.*

APPENDIX No. 23.

REPORT OF W. T. GREEN, *D.L.S.*

MISCELLANEOUS SURVEYS IN SOUTHERN ALBERTA.

OTTAWA, March 1, 1908

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report on my survey operations in southern Alberta during the season of 1907.

In accordance with your instructions of April 22, I left Ottawa for Calgary on April 29, and arrived there on May 3. All through the west the season was very late, and the settlers were anxiously awaiting the advent of warmer weather. Little or no seeding had been done up to this time and grave fears were being entertained as to the safety of the crop for 1907. I organized my party in Calgary, where I found that men were fairly plentiful. With the exception of cook, the positions on the party were easily filled. It was difficult to secure a good cook for the wages paid by the Department.

On May 9 I left with the party by train for Claresholm, a flourishing town on the Calgary and Edmonton extension of the Canadian Pacific railway. Like so many towns in the west, the growth of this place has been phenomenal. Four or five years ago there was nothing but the station house, a mere dot on the prairie, while to-day it is a thriving centre of industry with a population approaching the thousand mark. The country to the north and east which has so long been the undisputed territory of the ranchers is now being converted into farms. All around could be seen the smoke of the steam ploughs turning over the virgin soil. I understand that hundreds of these outfits have been brought into southern Alberta within the last year and as, under favourable circumstances, they can turn over twenty or thirty acres per day, one can readily see what a factor they are becoming in the development of the country. Fall wheat can be grown quite successfully in southern Alberta, and will, in a few years, I think, be an important asset to this portion of our great West.

On May 10 I hired a livery and with three of my party drove to Lyndon to the home of Mr. Erwin, with whom Mr. Hawkins stored his outfit when he closed operations the fall before. This drive proved to be particularly interesting and instructive.

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leading as it did through the Canyon ranch and the 'Forty-four.' The latter with an area of about 17,000 acres is one of the largest ranches in this neighbourhood. On all sides were to be seen the ghastly relics of the most severe winter Alberta has experienced for over twenty years. Dotting the hillsides, in the ravines, lying in the creeks, and sometimes on the trail were seen the carcasses of last winter's victims.

I found the transport outfit in very fair condition, with the exception of the buckboard which would have lasted scarcely a month on our work. Accordingly I sold it to Mr. Erwin and purchased instead a 'democrat' from the agent of Gray's Carriage works, in Claresholm. I spent two days in Claresholm, having the horses shod, wagons and harness repaired and purchasing supplies.

On May 15 we moved to the northeast quarter of section 35, township 13, range 24, west of the fourth meridian. The country between Claresholm and Little Bow river is rapidly becoming settled and but little land available for settlement is vacant. Generally speaking the trails are good. The Blackfoot trail has been fenced up across many of the sections, but the road allowances are rapidly being graded into shape and before long will be as good as any in the west. The surface of this district is open and undulating, becoming more decidedly rolling as one approaches the Little Bow. Close to the river the soil is of a light sandy nature, becoming heavier farther back. Mr. A. C. Nash, for whom the survey was performed, has a comfortable home on the edge of the river. He is engaged entirely in ranching. High cut banks are to be found along the Little Bow with outcropping of rock in several places. No evidence of coal was found though there is a good coal mine within reasonable distance where the settlers obtain their fuel.

I completed the work in this township on May 21, and on the 22nd moved to Claresholm again. The afternoon was spent replenishing supplies and on the morning of the 23rd we left for our next work in township 13, range 1, west of the fifth meridian. There is a surveyed trail from Claresholm to Lyndon postoffice, a distance of about twenty-two miles. This road is good in dry weather, but in a rainy season becomes very heavy. There is a much shorter route across the Canyon ranch, but several steep hills make the road impracticable, except for a saddle horse or a light load. From Lyndon to Lyndon mill, a distance of seven or eight miles, the Lyndon Lumber company have graded a road for the convenience of settlers drawing lumber from their mill in section 11, township 13, range 30, west of the fourth meridian. This road like the one from Claresholm to Lyndon is very heavy in rainy weather, although excellent in a dry season. We reached Lyndon mill at noon on May 25, and as we could get no farther with wagons, we camped on Lyndon creek near the mill.

Lyndon mill has a capacity of 12,000 feet per day and supplies the settlers for miles around. They have been operating now for over two years and have enough timber in sight for two or three years without being compelled to move their mill. Lyndon creek is about eight or ten feet wide and two to three feet deep. Its water was unquestionably the choicest I found all season, clear as crystal and cold as ice.

The district is eminently a ranching country, though the settlers between the mill and Claresholm make some attempts at cultivation. Early frosts coupled with the hilly and broken nature of the country make agriculture to any great extent impossible.

On June 5, having completed the work in township 13, range 1, we started for township 14, range 1, and although our next camping place was distant only about eight miles in a straight line from Lyndon mill, we did not reach our destination until noon of June 6. In that time we travelled nearly twenty miles, making long detours around the higher hills and frequently doubling for miles over the smaller. We camped in section 30, township 14, range 1, on Willow creek, and from there with one or two flying camps I was able to complete the work in this vicinity.

This township can scarcely be equalled as a grazing and ranching country. A luxuriant growth of grass, a plentiful and permanent supply of water in Willow creek

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and its numerous tributaries and plenty of open land for cutting hay, all help to make an ideal stockman's home. Much of the land in the northern and eastern portions would be suitable for grain growing if it were not for the danger of early frosts. In this connection a peculiar phenomenon was noted. Willows postoffice, situated in section 12, seems to be the line of demarcation for the ravages of the summer frosts. Below there, along Willow creek, vegetables and grain will mature well; above that point a crop is never sure. Several ranchers have quite large holdings—the McIntoshes, McDiarmid's and Riley and Thompson's being the largest stockholders. There is a fair road from Willows to Nanton, a thriving town on the Calgary and Edmonton extension of the Canadian Pacific railway. This trail crosses over a high hill in the northeast of township 14, range 1, and I believe the provincial government intend surveying a new road to circumvent this hill.

On July 26, we left for the forks of Highwood river in the southwest of township 18, range 1. With the exception of about four miles through Cochrane's ranch we found an excellent trail from the 'C.-C.' ranch in township 14, range 2, to the forks. On the way we passed through a portion of the 'Bar U' ranch, one of the largest in the whole of the west. Travelling north the country changed from the roughly rolling and hilly character of the Willow creek district to the gently rolling and open farming country along the Highwood. Some excellent crops were noticed. The country along the river is very picturesque, on the one side high almost cut banks with a growth of poplar and willow, on the other a gently undulating flat with just a fringe of trees along the edge. A bridge is badly needed here, as the river is a dangerous ford at low water and in high water is particularly dangerous. One of the settlers informed us on our arrival that there was an excellent ford, and trusting to his superior knowledge of the country, we attempted to cross with our loaded wagons. Suffice to say that we were thankful to get our horses and dunnage back safely, and were content to remain on the high side of the river.

After two days survey here, we left for our next work in township 20, range 4, west of the fifth meridian on July 30, going by way of High river and Okotoks, two prosperous towns on the railway. On August 3, we reached section 21, township 20, range 4, finding an excellent trail the entire distance of sixty-five miles. Like Willow creek district, this is a ranching country though there is less open country. Some excellent hay flats are to be found along Ware creek or as it is locally known Sinnot creek. I believe there is good timber in the west of this township, and it is expected that a mill will be operated there in the near future.

After completing the work here, we left for Calgary en route for Banff to perform certain surveys there pursuant to your instructions of July 25. We reached Calgary on August 15, and having secured a car, we loaded our outfit the same night. Owing to the irregularity of the train schedules at this time, we did not reach Banff until the morning of the 17th and we were forced to unload and move out to camp in a regular downpour of rain. This turned to snow during the night, and on the morning of the 20th, I received my first impressions of the mountains. So much has been written of the gorgeous splendour of the scenery here that anything I could say would seem of little value. But the grandeur of the view that met my gaze that morning will not soon be forgotten. Mt. Rundle, Sulphur mountain, Cascade mountain, Mt. Edith, the Vermilion and Sawback ranges and Tunnel mountain glistening in the sun with their new garments of snow, and rearing their lofty peaks until lost to view in the clouds above, made a memorable picture indeed.

The popularity of Banff as a summer resort is so widespread that the numerous hotels, both tourist and commercial, are taxed to their fullest capacity during the summer season. It is the centre from which so many expeditions, of a nature interesting to the mountain climbing enthusiast, can be made and is an ideal spot for such to enjoy their summer vacations. Cascade mountain and Mts. Edith and Rundle challenge

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the more daring of the climbers, while Sulphur and Tunnel mountains provide an interesting climb for the less adventurous.

Too much credit cannot be given to the superintendent and officials of the Rocky Mountains park for their excellent work in making possible many of these expeditions.

Pack trails have been cut and blazed, roads which have not their equal in Canada have been graded along the valley of the Bow and everything possible is done to make the transient guest remember his stay in Banff as one of the bright spots in his travels. And yet much more could be done to enhance the natural beauty of the place. With the power right at hand, in the Bow River falls, the part of the valley known as 'The Loop' could be transformed into a veritable fairy land. As the editor of one of the western weeklies remarked, 'it could be made to rival the world-famed Coney Island.' At present there is little or no entertainment provided during the summer evenings for the hundreds of guests and tourists and this lack must be very noticeable to the large percentage of Americans among them.

The game regulations are rigidly enforced and the result is becoming noticeable. The park is a city of refuge for all kinds of game and this fact is doing much to preserve many of the animals peculiar to our Rocky mountains. A great many sheep and goats were seen on the Sawback range and they seemed but little afraid of man.

On September 2, having performed as much of the traverse of Bow river as was convenient from our camp in 'The Loop,' I moved to the 'Brewster Leasehold,' the resurvey of which occupied three weeks.

In the second week of September we had a heavy fall of snow lasting for three days and delaying the work considerably. One of my greatest difficulties while working in the vicinity of Banff was the procuring of hay for the horses. Even at twenty dollars per ton, only hay of the poorest variety imaginable could be secured, one bale at a time. Those who had any for sale were very independent and it needed a deal of persuasion and pleading to get them to part with any. Oats at two dollars per sack were somewhat prohibitive. All the hay is brought by train from Calgary though the park authorities manage to cure a little each year for the use of the buffalo through the winter. It is no uncommon sight to see men wading up to their knees around Vermilion lake, carrying out grass forkful after forkful to some high spot where it could dry.

The present holder of the Brewster lease has a large herd of dairy cows during the tourist season. Through the summer months he has upwards of fifty milch cows with which he supplies the larger hotels. In the fall he ships all but twelve or fifteen to some ranch farther east, wintering them there until the opening of the next season. With those he keeps he can provide for the winter population of Banff.

The survey of the Brewster leasehold proved particularly difficult and arduous. With the exception of the portions of the northwest limit of the old park, the work could have been accomplished much more easily and expeditiously in winter. Forty-mile creek, a rushing mountain stream, had to be forded again and again in the traverse of that portion of the boundary of the lease. One of the party more daring than the rest would manage to make the first crossing and then by means of a rope the rest could be steadied across to safety. It was with many misgivings, I watched the transitman make the trips across with the instrument on his back. One misstep and both might have been washed away. We would probably have managed to save the former but the loss of the latter would have tied up the survey for days.

However the work was completed and the entire boundary resurveyed with no very serious mishaps. The length and bearing of the easterly half of the northwest limit were obtained by traverse saving us at least some of what appeared to be almost impossible chaining.

On September 26, we moved camp to section 4, township 26, range 11, following the carriage road which the park authorities have put in such splendid shape. On our way we passed through the deserted village of Anthracite. Churches, hotels, stores and dwelling houses all bear testimony of the sometime presence of man. Good

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coal was obtained here but after the mine was worked out the miners drifted away some to the new Pacific Coal company's holdings at Bankhead and others farther west. There is another mine at Anthracite which will probably be operated in the near future and the town will again become an inhabited centre.

From this camp we traversed Cascade river through township 25, range 11, and the left bank of Bow river as far as the east boundary of section 28. The want of a boat handicapped us very much in the traverse of Bow river. If it had not been for the railway bridges across the river I would have been compelled to purchase a punt or canoe. As it was we had many a long weary walk on account of being unable to cross the river.

On October 2, we moved camp to section 27, township 25, range 11, and from there completed our work in this vicinity. The traverse of both banks of Bow river through this township necessitated more or less cutting throughout the entire distance. The right bank, especially in the western part of the township, was heavily wooded with large spruce and jackpine down to the water's edge.

We completed the work on October 9, and on my return to camp that day I received your telegram instructing me to proceed at once to subdivide a portion of township 27, range 17, west of the fourth meridian. On the morning of the 10th we left by trail for Calgary. Considering the nature of the country through which it passes the road from Banff to Calgary is in splendid condition. If the portion between Canmore and Exshaw were properly fixed, it would equal any carriage road in Canada. From Calgary to the boundary of the Rocky Mountains park the provincial government graded and are still grading their share of the road, and the park authorities are to be credited for the excellent work they have done on their portion from there to Banff. In a few years this should make a very popular driveway whether for horse or motor carriage.

On the evening of the 10th we reached Exshaw, where we remained until the next day to have the horses shod. Exshaw is a new town and its chief industry, the cement works, was not yet in running shape. The immense factory with its gigantic frame of steel, gave promise, however, of a thriving business. It was estimated that employment would be given to fully three hundred and fifty men in the night and day shifts. The town is owned by the cement company, and it was refreshing to see a place where real estate offices did not crowd out everything else.

On the night of the 11th we reached Morley, the Indian agency. Here I tried to secure the services of two Indians for the remainder of the season, but the wages did not seem sufficiently good to tempt the better class.

From Morley we made the remainder of the distance to Calgary in a day and a half, reaching there at noon on Sunday. The entire journey was made in three days of actual travelling, a fact which speaks well for the character of the road. No more enjoyable drive could be taken in the west than that from Calgary to Banff.

I was detained in Calgary from October 13, to 22, awaiting instructions from the Department which, unfortunately, had gone astray in the mails. The most regrettable feature, however, was the loss of the splendid weather at this time.

On the morning of October 23, we left for township 22, range 4, west of the fifth meridian. On our way we passed through the Sarcee Indian reserve, about half of which is composed of some of the finest land around Calgary.

The surveyed trail from Calgary to Priddis is in splendid condition. West of there, the road is only fair and in several places in a wet season would be very bad. In one bog we broke the reach of one of our wagons, delaying us several hours. On the 24th we reached camp in section 35, township 22, range 4.

This township is more wooded than the Willow creek country, but is still well suited for ranching. Most of the valleys are open and while much of the land, upon which hay could be cut, is somewhat swampy, there is plenty sufficiently high and dry to provide winter fodder.

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As yet there are only four settlers in the township and their holdings are comparatively small. An attempt has been made at agriculture, although not to any great extent. Last year the crops were entirely ruined by the early snow and frosts, and the oats could only be used as green feed. In time, however, I believe that farming will be carried on all through this district as the land becomes cleared and drained. There is quite a large amount of fair timber in the southern and western portions of the township, and plenty of standing fire-killed jackpine and poplar for fuel.

On November 4, we moved to section 18. The trail across the township is impassable in a wet season and even when we used it, was very soft in several places. The road ends at the northeast corner of section 18, and we made an attempt to open out a road into the next township west. We succeeded in reaching the southeast corner of section 18, but found that beyond that point wagons were useless. Fallen timber combined with the mountainous nature of the country to the west made pack horses the only practicable means of transport. Although we made an effort to do the work in township 22, range 5, I decided, after three days of heart-breaking walks, that this part of the work would have to be abandoned. As the season was so far advanced and as there were no settlers in the township, I did not think it advisable to incur the extra expense of purchasing a pack outfit.

Accordingly on November 11, we moved back to section 17 to complete the work in township 22, range 4. This was accomplished on the 13th, and on the 14th we moved to section 25 of the same township. The return trip across this trail was, if anything, worse than the first. The ice on Fish creek was from one-half to one inch thick, and wherever the trail led across we had to cut a way through. Mr. Cummings, who is homesteading the northwest quarter of section 24, having purchased the southwest quarter of section 25 from the Canadian Pacific railway, asked us to locate his corners for him before leaving the district. Accordingly we spent the 15th running the west half of the north boundary of section 24 and the east boundary of section 26, township 22, range 4. The lines were completely grown up, not a trace of cutting being visible. Evidently when the original survey had been made, there was either open country or small scrub, while now there is poplar up to six or eight inches in diameter. I found the mounds easily enough after cutting out the lines, much to the surprise of Mr. Cummings, who declared that no monuments had ever been erected. I renewed the mounds at the quarter section on the north boundary of 24, also the pits at the northeast of section 26.

On November 16, we left for section 35, township 22, range 2, where I had made arrangements for wintering the horses and storing the outfit. We reached there that evening. On the 18th I sent in to Calgary, a distance of some twelve miles for any mail or telegrams which might have arrived in regard to further work. I received none though I presume that your wire in reference to the traverse of Willow creek must have arrived just after my men had called. I might say, *en passant*, that this telegram reached me in February of 1908.

I decided not to delay the discharge of my party any longer and on the 19th I packed the outfit away and made out the articles of agreement with Mr. Stobo. As the horses and transport outfit were all in good condition for another year I presumed that it was not your intention to sell any part of them. Your letter of instructions which arrived later was in accord with what I had done.

On November 20, I discharged my party although I had to remain a day or two in Calgary making arrangements with the bank for the payment of the cheques. I found the Bank of Montreal very courteous and I had no difficulty in getting the party paid.

On November 22, I left Calgary arriving in Ottawa on the 29th.

I have the honour to be, sir,

Your obedient servant,

W. T. GREEN, D.L.S.

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APPENDIX No. 24.

REPORT OF ERNEST W. HUBBELL, D.L.S.

RESURVEYS AND INSPECTION OF CONTRACTS IN THE PROVINCE OF SASKATCHEWAN.

OTTAWA, ONT., March 7, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report of my survey operations in the province of Saskatchewan, during the past season.

In compliance with your letter of instructions dated April 10, 1907, I left for Winnipeg on April 23, arrived there on the 25th and remained over one day in order to inspect five thousand iron section posts, at the Manitoba Iron Works. Accompanied by Mr. Miles, D.L.S., I visited the said works and tested several iron bars, picked at random by driving them into partly frozen ground, the regulation depth. None were broken or defective. I then telegraphed you that the inspection was satisfactory. The next day I left for Moosejaw, my organizing station, and arrived there on the 28th, where I found my camp pitched and several of my men awaiting me, as previously arranged.

The following week we were engaged in overhauling and repairing the survey outfit, bringing in horses from their winter quarters, purchasing supplies, training chainmen and attending to the numerous essentials for the equipment of a survey party.

On May 4, we were ready to start, but owing to inclement weather, and as there was no grass for the horses, we decided to wait for a few days. On the 6th one of my horses was injured and although a veterinary surgeon was called at once and an operation performed, it was of no avail; the poor animal died in great agony. On the 7th we shipped 1,600 pounds of supplies by rail to Caron, distant eighteen miles, and the following morning left Moosejaw, making but ten miles as the trails were soft and muddy, besides a heavy snowstorm about two o'clock compelled us to pitch camp.

The next day we reached the initial point of our survey, section 6, township 17, range 29, west of the second meridian, and pitched camp, during a severe snowstorm. The whole country was covered with snow ten feet deep in the ravines and the weather like what we would expect in November.

We commenced our season's work by running the east boundary of section 6, township 17, range 29, and proceeded northward along the meridian between ranges 29 and 30, renewing obliterated corners and re-establishing lost ones. There being no township monument at the northeast corner of section 36, township 17, range 30, the fact was reported to you, this monument was destroyed in the construction of the Canadian Pacific railway grade (now abandoned) and is not the only instance to my knowledge, where survey monuments have been destroyed in construction of railway grades.

It appears to me that some provision should be made by the engineer in charge of construction to perpetuate a mark showing the position of these monuments and not heedlessly ride roughshod over government land marks, which are essential to the settlers and others for establishing the boundaries of their homesteads or claims.

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In the triangulation of Pelican lake, township 18, range 30, we found an error of 10 chains, this accounts for the excess in the quarter section adjoining the correction line.

After considerable trouble with some of the settlers, owners of these sections, I was able to procure in writing their consent to the rectification of the erroneous monuments, thus adjusting a longstanding dispute and giving to each settler his theoretical area. The excessive width of $1\frac{1}{2}$ chains existing on the correction line between townships 18 and 19, range 29, I am afraid, cannot be adjusted without many complications and much expense, as the settlers all have accepted the original monuments and built their houses and fences accordingly, nor do I anticipate further complaints, all now appearing satisfied with the existing state of affairs. I therefore, recommend that the department take no further action in this matter.

We now proceeded to survey a meridian through townships 19, 20, 21 and 22, in range 29, which had been omitted in the original survey of these townships some twenty years ago.

The survey of this line did not meet with the approval of all the settlers concerned, many being under the impression that the strip of land eight chains wide, was part of the sections they had bought or homesteaded. On May 24, we arrived at Craik. The weather up to this time had been cold and raw with considerable frost in the ground. The country passed over is all prairie, fairly level, soil generally sandy loam, and worth from eight to fifteen dollars per acre. A fair portion is under cultivation and many new arrivals were employed building houses, fences and tilling the soil. Firewood and coal is procured at Caron and Mortlach, two small but thriving towns on the main line of the Canadian Pacific railway. The price of lumber varies from twenty-five to thirty-five dollars per thousand.

The Canadian Pacific railway is extending a branch line from Moosejaw to The Elbow on the south branch of the Saskatchewan river, graders were hard at work on this extension and a townsite was being surveyed in township 20. This railway will be of great advantage to the settlers in this district, who find it a rather long distance to the towns previously mentioned. I understand that this line is now in operation.

We next proceeded to township 25, range 25, and traversed an arm of Last Mountain lake, which passes through sections 25 and 36 and had been omitted in the original survey. My next work consisted of the retracement of section lines and eight miles of traverse of the west shore of Last Mountain lake in township 27, range 24, which was finished on May 31.

The weather continued cold and raw and the ice on this large body of water remained unbroken, something unprecedented. However, the frost was out of the ground and most of the settlers in this vicinity had completed their ploughing and seeding.

I now proceeded to township 35, range 1, west of the third meridian, to make a resurvey of the township, which, upon examination, was found to have been carelessly surveyed. There were no iron posts, and the few wooden ones found were almost rotted away. The positions of the survey monuments, more especially the quarter section corners, were most irregular; however, the greatest error was on the east boundaries of sections 3, 10, 15 and 22. The remainder, after considerable trouble were rectified, apparently to the satisfaction of most of the settlers. My experience in resurveys taught me that it is impossible to satisfy all the occupants or owners of land, someone is bound to raise an objection on principle, notwithstanding the fact that in some cases they gain considerable acreage and have their boundaries made straight. The Canadian Pacific railway has a line across this township, and the townsite of Elstar is surveyed and comprises portions of sections 3 and 10. I traversed a lake of about eighty acres in section 23, which had been omitted in the original survey. A detailed report of the resurvey of this township was sent you on June 17. The country in this vicinity and for miles around is prairie, surface level to rolling, soil generally

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sandy loam, suitable for the production of wheat, oats, barley, flax and vegetables, in fact some of the finest crops in Saskatchewan are raised here, and land is worth from twenty or thirty dollars per acre. Plenty of good water of a permanent nature is obtained from the many large lakes. A limited amount of firewood is procured from around Manitou lake, distant twenty miles, a supply which before very long will be closed to the settlers, as this timbered land is very rapidly homesteaded. It would be of inestimable value to the settler could a tract be reserved as a fuel supply. Grain and other farm produce is taken to Saskatoon, twenty to thirty-six miles distant.

Our next work was in the vicinity of Prince Albert (St. Louis settlement), distant by trail one hundred and thirty miles, where we arrived on July 3. During this trip we passed over a beautiful stretch of agricultural country, in fact the most productive of that great wheat-growing province of Saskatchewan.

It is superfluous to dwell on the resources of this well known portion of our great West, suffice it to say, that there are few, if any, vacant homesteads. Land varies from eight to twenty-five dollars per acre. The wooded country commences about township 42, extending northwards. On July 4, we commenced the resurvey of township 46, range 25, west of the second meridian and finished the same on the 12th. This fractional township comprised of river lots is all settled with considerable land under cultivation.

The surface is fairly level and mostly covered with small poplar and willow, the soil generally being sandy loam. Very few of the original posts were found and great confusion existed among the settlers as to the boundaries of their claims. A surveyed trail runs through this township which was tied to our work when practicable. A lake of about seventy acres not shown on the original plan, in lots 14, 13, 12 and 11 was traversed upon request of several of the settlers. Whilst at work in this township and vicinity, we were troubled very much with flies, commonly known as 'bulldogs.' They are most vicious in their attacks upon animals, but fortunately disperse when the sun goes down and are not 'in evidence' during wet or damp weather.

My next work was the resurvey of township 44, range 22, where we arrived on July 17. A great portion of the township is muskeg or swamp, and with the exception of a few open spaces, all covered with timber, principally poplar and willow, the former averaging six inches in diameter. There are few settlers in this township, it being too wet for cultivation. Not many of the original wooden posts were found, and these were far from their correct positions.

A surveyed trail across this township was connected with the new monuments of survey. Owing to the immense areas of impassable muskegs and swamps, it was impossible to survey all the section lines, although several attempts were made, the remainder if necessary will have to be done late in the fall or winter when everything is frozen over.

Whilst engaged in the survey of this township the mosquitoes were almost unbearable. Only once before have I experienced such a siege. Most of the time the weather was dull, cloudy and very hot, this combined with the wet surface of the country produced an unequalled climate for the propagation of mosquitoes. It was only by perpetual smudges that temporary relief was obtained for man and beast. For the information of the uninitiated and especially those who picture camp life as all sunshine, a few days spent in our camp at this particular time would effectively disabuse their minds as to the many pleasures one has on a survey.

According to your instructions of July 13, we returned to Saskatoon in order to effect, if possible, adjustments of certain disputes, between several settlers in townships 32 and 34 ranges 1 and 2, west of the third meridian and recently resurveyed. After ten days continuous travel we reached our objective point and proceeded at once to investigate the various claims or grievances of the disaffected settlers, in which we were partially successful. A detailed report of proceedings on this occasion was forwarded you August 14.

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My next work was the resurvey of township 49, range 26, where we arrived on August 23, after six days of continuous travel, during which we averaged twenty-four miles a day. The country passed over has already been reported on and I can only add that at this season of the year, the crops were at their best and looking remarkably well, but owing to the exceptionally late spring, all crops were two or three weeks later than usual.

Township 49, range 26, is heavily timbered, principally with jackpine, spruce and some clumps of poplar, from which all the mercantile timber has been taken. About ninety per cent of the soil is sand totally unfit for cultivation. Except a few half-breeds, who have shacks along the river, there is but one settler, the owner of a tannery and manager of the ferry at the crossing. The traffic across the river at this point is something wonderful, no matter the hour of the day, teams are always on the ferry, the rate charged is five cents per team.

Considerable sand and firewood is hauled from this township to Prince Albert. Little Red river meanders through this township and averages about one chain in width and from four to eight feet in depth, has a current varying from four to six miles per hour and is spanned by a fine iron bridge in section 14. Great quantities of sawlogs are brought down this stream by the Prince Albert Lumber company.

A timber reserve comprising nine sections in the southwest corner of the township, I understand, is to be abandoned and thrown open for settlement. Owing to want of time all the section lines were not retraced.

On September 7, we moved camp to section 23, township 50, range 25, and from here I re-inspected township 50, ranges 24 and 25, according to your letter of instructions. Owing to unprecedented weather conditions, we had great difficulty in taking a flying camp into township 50, range 24. Practically all this portion of the country, except the sand ridges was under water, even where mounds had been built last year. We had great difficulty in getting part of our outfit across Garden river owing to the unusual depth of water, and the bad muskeg approaches, in so doing, three of our horses were nearly drowned. We next proceeded to Kinistino, about seventy-five miles distant, a prosperous town of three hundred inhabitants, on the Canadian Northern railway, and made some corrections and resurveys in townships 46, ranges 21 and 22. Township 46, range 22 is nearly all covered with small bush. Owing to the fact that there are no survey monuments to be found, a resurvey is being petitioned for by the settlers.

Our next work was the resurvey of township 46, range 23, which was commenced on October 3, and finished on the 26th. This township is partly covered with poplar and willow. The surface is undulating to rolling and the soil generally first class. A surveyed trail to Prince Albert, closed in places, by some of the settlers, runs across this township. It was tied to several of the new monuments. The Canadian Northern railway is constructed across the northern part of the township and the station of Brancepeth is situated in section 20. All the homesteads are taken and considerable land is under cultivation. There are several rather large lakes, one of which we traversed upon request of the occupant of section 10.

Great quantities of grain and vegetables are grown in this township and vicinity. In accordance with your telegraphic instructions, dated October 8 I proceeded to Saskatoon on the 19th.

On November 4, I started on my tour of inspection of survey contracts. From Prince Albert we travelled to Carlton where we crossed Saskatchewan river on a ferry, thence along a well beaten trail to township 47, range 11, west of the third meridian. We now commenced the inspection of certain survey contracts north of Battleford.

On November 26, we left Battleford and proceeded to Shellbrook, inspecting a contract in that vicinity. From here we went to Prince Albert where we arrived December 15, in the midst of our first real heavy snowstorm.

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My next and last work of the season was the inspection of a contract north of Prince Albert in the vicinity of Egg lake.

The survey work of contractors now required by the Department is of such precision that contract surveys of to-day must be unusually well done and the rigid inspection upon completion of a contract has a strong influence upon the work, it being the exception now for a contract or portion to be condemned.

During the period of field operations, in which I was engaged last season, extending from May 4, to January 8, we made ninety-two camps and travelled by trail alone eighteen hundred miles (as far as Moosejaw is from Ottawa.) This does not include the everyday use of horses on the usual survey work, nor the freighting of supplies and firewood from various points, which frequently involved on one trip alone a journey of seventy to one hundred miles.

This proves conclusively the necessity of having good horses on a survey outfit having unusually long journeys, and in order to keep them in condition for these long trips plenty of oats must be at hand.

In the performance of my allotments of work extending over a large area of northern Saskatchewan I had ample opportunity to gather knowledge of the resources of this country.

Settlement is progressing even more rapidly than was anticipated. In every direction the land is being cultivated and the ever increasing magnificent fields of grain are sufficient guarantee and advertisement of the prosperity of this fast growing country, which as yet is in its infancy.

Last season was exceptionally backward; it was not until June 10, that the buds began to sprout, and the ice was in the larger bodies of water until June 1. The summer was wet, cold and raw; in fact, in places a slight frost was apparent every month, consequently the crops were from two to three weeks later in maturing; however, as compensation, the months of October and November were all that could be desired and the weather perfect. On November 11, most of the smaller lakes were sufficiently frozen to walk on.

Railways are gradually extending through this vast country, greatly facilitating transportation, and many iron railway and traffic bridges have been constructed over the larger rivers. Good trails extend in every direction, even in the partially settled districts, and it is an easy matter now for the settler or land seeker to travel in any desired direction.

Game of the feathered variety is to be had in great quantities, in fact in certain localities the supply appears inexhaustible. Rabbits are very scarce; it would appear as if every few years they disappear almost entirely.

Wolves were numerous and bold, so much so that they would in daylight enter a corral to kill and carry away sheep. North of Prince Albert moose and other deer were quite plentiful, and we came across many of their yards. It might be well to record here that we found some recently constructed mounds trampled flat by these animals.

The price of a team of good horses varies from three hundred dollars to three hundred and fifty dollars, oxen about one hundred dollars per yoke, and cows from forty dollars to fifty dollars each.

Farm produce commands a high price, potatoes when procurable one dollar per bag, new potatoes seventy-five cents to eighty cents per bushel, butter thirty cents to forty cents per pound, milk seven to ten cents per quart, eggs twenty cents to thirty-five cents per dozen. Of course, these prices vary during different periods of the year. Great progress is perceptible in all towns and villages. There are many handsome buildings and industries, as well as a number of splendid schools throughout the province.

The country in which new surveys are being projected north of Saskatchewan river is covered for the greater part by bush, principally poplar, spruce and jackpine, suitable for building purposes and fencing, but not in sufficient or paying quantities for lumbering.

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The soil is generally sandy loam suitable for the production of wheat, oats, flax and vegetables.

Numerous streams and lakes afford a permanent supply of excellent water.

We did not perceive any indication of minerals of economic value, stone quarries, coal or lignite veins, although it is the prevailing opinion that there exist vast quantities of coal, as yet undiscovered. In the province of Saskatchewan north of Saskatchewan river the only town of any importance or having railway connection is North Battleford, which has a population of three hundred, and numerous fine buildings, with good hotel accommodation. The Dominion Government has a combined land and immigration office here.

North and east of Battleford there are numbers of vacant homesteads, which offer to the new settler unequalled advantages, and it may be worthy of note that the climate in this northern latitude is unsurpassed, in my opinion superior in every way to that of two hundred miles farther south. Large quantities of whitefish and other varieties are obtained from many of the larger lakes.

Good trails extend in every direction except north of Prince Albert, where it is still unsettled. However, as the Canadian Northern are extending their railway into this country and are now at work constructing an iron railway and traffic bridge across the Saskatchewan at Prince Albert it is only a matter of a short time before this portion of our great country will be the objective point for the new settler. In conclusion, I wish to record my appreciation of the services rendered by my assistant, Mr. Earle M. Dennis.

I have the honour to be, sir,

Your obedient servant,

E. W. HUBBELL, D.L.S.

APPENDIX No. 25.

REPORT OF A. W. JOHNSON, D.L.S.

SURVEYS IN THE WESTERN PORTION OF THE RAILWAY BELT.

KAMLOOPS, B. C., February 8, 1908.

E. DEVILLE, Esq. LL.D.,
Surveyor General,
Ottawa.

SIR,—I began the season's work at Agassiz on February 15, by resurveying lots 536 and 39, group 1, and the adjacent land.

As usual many of the original posts were missing, and I had to reconstruct these lots from what data was to be found on the ground.

There is good hill land in section 6, township 4, range 28, west of the sixth meridian and in the section immediately south of that, which, though on a hill, is very easily cleared, there being only a comparatively recent growth of alder and birch. We were so much hampered by three feet of compact snow that I ordered snowshoes for the party. There is no prettier place on the Canadian Pacific railway than the Agassiz valley, with its soft, moist climate. Fruit, hay and hops grow very well and the last named is being cultivated to a large extent. To a northwest farmer, who wants a softer climate and a beautiful home this land should appeal.

I had received instructions to survey some dyking lands on Pitt meadows as soon as possible, and judging that the snow would have gone I moved to Sturgeon slough

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on March 5, in township 40, east of the coast meridian. The whole of the undyked part of Pitt meadows is a swamp, cut up by many sloughs. I got rubber boots for the men, otherwise it would have been killing work breaking through ice and wading in cold water up to your middle for weeks. This swamp was evidently at one time part of Pitt lake, and the sloughs which cut it up are affected by the tide as is the lake itself. We had more luck finding old posts than I expected, and I have no doubt that the survey we made very nearly coincides with the original. In some cases we put long cedar posts as well as iron ones to mark corners, for the latter were sometimes below the water at high-tide. There is undoubtedly splendid land on these meadows.

The main difficulty in dyking here is, I should judge, to keep the water from seeping under the dyke. As to whether it is feasible from a business point of view I am not expert enough to give an opinion. There is someone intending to do this particular piece of work and he is probably not doing it for fun. The lake is so shallow at the south end that if dyking turns out a success I believe it can be extended in to the lake itself. As you paddle up, even in the middle, you can touch bottom with your paddle for two miles.

We were troubled a great deal by wet weather at the end of March and the beginning of April. For two weeks it hardly ever stopped raining and we were thankful not to be in the bush.

In the middle of April I went on with the traverse of Pitt lake itself. The west shore is very precipitous, the rock dropping into the water in perpendicular bluffs in many places and giving us endless trouble with the chaining and especially when planting posts at section corners or witness posts. It was not an uncommon thing to spend three hours getting a correct measurement to a point where a post could stand without the men being in imminent danger of falling off. When men are thinking more of their foothold and the rocks a hundred feet below, than of the stones they are painfully picking out of the cliff for a mound the work is not done quickly. And the fact that the chief is wondering whether the transit, already much battered, will slip over that particular edge or not, does not help matters out.

While this traverse and others on the meadows were being cut I ran a triangulation up to the head of the lake from a base on the long tangent on the Canadian Pacific railway, immediately east of Pitt river bridge. This was done with considerable accuracy, though I was bothered by funny trippers from Vancouver throwing away the large red and white signals that were conspicuous on rocks close to the water. At any rate I have no doubt that the section corners laid out around the lake and the belt limit are much more accurately placed than would have been the case had the work been carried up from the south end of Pitt meadows by traverse.

There is one way on the west side at the mouth of the small valley that offers a splendid landing for picnic parties and there is good timber up that valley.

In township 6, on the west shore are some benches with good timber which are being worked and on the east shore in the same township are similar benches, also being worked. The east shore is generally not so rough as the west, though there are two or three inaccessible cliffs that I had to climb around or work across by triangulation.

Other work was pressing so I did not traverse much more than half the lake, but went on to the north end, laid out my second base, and ran a mile or two of the actual belt limit on both sides of the water, so that timber cruisers would have no difficulty in finding it.

The mountains around the lake are not particularly high as mountains go in British Columbia, not more than five or six thousand feet, but they are very precipitous, one bare precipice piled on another as far as you can see. But at every creek mouth and on benches at other places there is good timber and a large number of logs have already been taken out to New Westminster.

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On my way to Keefers in the upper country I did two days' work at the quarry on Pitt river about which there is some dispute, and on May 27, began work at Keefers. Here I laid out as accurate a base as I could with the appliances I had, on the Canadian Pacific railway track and connected this with the nearest section corner. While I was doing this my picketman was putting up signals on both sides of the Fraser, for it was impracticable to get out of the canyon without crossing the river. Then as soon as I began to read angles I sent this man with a small party up the Nahatlatch river to plant signals on convenient peaks and to put his last two as nearly twenty miles back from the railway as he could.

It is all to his credit, and saved me much time that the actual railway belt passed about midway between his last stations which I made my second base. A surveyor will appreciate a feat of this sort. He had to canoe and pack on his back through forest without the vestige of a trail and pick out his peaks as he could catch glimpses of them through the trees or from the water and it is no exaggeration to say that had he been a couple of miles out it would have meant four or five days' extra work.

The weather went to pieces in June just as I began reading angles and on 'Two Squares' mountain I was held for ten days without a tent and with very little food, waiting on timber line for the clouds to lift. Every day we climbed the two hundred feet between camp and the signal and shivered around a poor fire in a gale of wind as the snow fell. After this however I luckily got all my other angles without difficulty, and was glad to make a close tie on my second base. Nahatlatch valley has very little if any agricultural land, but there is timber in small quantities, east of the lake and on the lake itself. West of the lake the valley is wider, up to nearly a mile, but though there is timber there, it is not in large quantities nor of good quality. From the lake to the Fraser the river is just a roaring rapid, large enough at the lowest water to develop tremendous power, for the drop is several hundred feet. The lake is not one sheet of water, but three, joined together by strips of quiet river and very beautiful. I expect that some day there will be a flourishing summer hotel on its shores and some enterprising man will build pack trails up to the basin on mount Whiskepig where one of the finest falls I have ever seen takes its rise.

These valleys on the edge of the timber must be seen to be fully appreciated and in spite of the punishment they get climbing through dense huckleberry or young balsam and windfall, there are few men, however unromantic, who do not forget their troubles when camp is pitched in the park country under the ice.

After tying on to my second base I ran the belt down to Mt. Douglas near Harrison lake where I had planted a post in 1903. This was not more than fifteen miles in a straight line from the Nahatlatch, but it was not advisable to spend weeks making a horse-trail and we carried everything on our backs. To those who have packed steadily for a month over high mountains any description is superfluous and to those who have not, no words of mine could make them realize what it is like. I believe some of the men had a change of socks, but there was little other changing done, in most cases none at all, and one man left because I would not let him carry as many blankets as he wanted. The line zigzagged over mount Whiskepig and finally ran straight for six miles to Mt. Douglas crossing three deep canyons on the way. As soon as we had packed with great tribulation up one three thousand foot precipice we found a three thousand foot hole beckoning us insistently. But at last in a thunderstorm under the ice of Mt. Douglas glaciers, a thunderstorm so strenuous that we fled into the snow and threw away anything that had iron on it, we tied on.

There is good timber on Silver creek which rises near Mt. Whiskepig, and keeps a distance of from one to three miles east of the belt along its entire course to Harrison lake; and though this creek is very rough and has two or three big falls, the timber will no doubt be taken out before long. It is all in the belt.

I did not post every section corner of this last six miles. Putting lines up those precipices is very slow work even when it is possible and it was not by any means al-

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ways so in this case Putting posts in on a very steep slope of rock is slower work still. So I put witness iron posts and also large wooden ones on the ridges and by the sides of streams in the canyons. As it is not likely that anybody but timber cruisers and prospectors, except surveyors furnished with the necessary data, will want to find the belt here, the above method will be sufficient, for prospectors will travel on the ridges, and cruisers in the valleys.

There is the usual wilderness of peaks with glaciers here here and there. Mt. Whiskepig is about seven thousand feet high, but the Snowy Group to the west and southwest is higher.

On my way back I ran the belt across the Nahatlatch valley. At the western end of this valley adjoining the belt, the land is very low and swampy. There are three hay swamps which are solid enough to carry a horse and were the saving of our train, but they would not grow crops because both in the summer when the snowwater comes, and more particularly in a winter rainstorm, they are flooded.

When I had posted the belt in the Nahatlatch valley I put most of my men to work making a pack trail up Bear creek, which is just outside the belt, while with three men I went north to Mt. Kythe to see what could be done about getting horses through. I found an unbroken range of high mountains, the lowest pass filled with glaciers, and I determined that should it be found impracticable to take horses over this ice that I would send them around by a hunting trail above Lytton, that I had used the previous winter on a trip partly for hunting and partly to find out the best way to get horses into the belt in that part of the country. I took care to impress on the men with me exactly which of the distant mountains were approximately on the belt and then came back to camp after a rough trip indeed. I gave instructions to push the trail to the foot of the ice and to try to get the horses over; but this proved hopeless so they built a cache and left a lot of food and other things there.

Meanwhile I had taken a few men down to Chilliwak and did some work in township 2, range 29, west of the sixth meridian. This finished, I met the mountain party at Keefers and paid everybody off. This was on August 24. Next morning I started seven men off with the train and told them to go up the trail mentioned above and cut a pack trail clear through Mt. Kythe on the north side of the range. This was done successfully and I now have a trail ready along the whole length of the unsurveyed belt from the Nahatlatch to the Fraser. The party came in for the winter on October 15.

I have the honour to be, sir,

Your obedient servant,

ALFRED W. JOHNSON, *D.L.S.*

APPENDIX No. 26.

REPORT OF G. J. LONERGAN, *D.L.S.*

INSPECTOR OF CONTRACTS AND MISCELLANEOUS SURVEYS IN CENTRAL ALBERTA.

BUCKINGHAM, QUE., Mar. 16, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I beg to submit the following report of my surveying operations for the season of 1907. I left Buckingham on April 15, and on my arrival at Edmonton, where I had my outfit of the previous season to meet me, I engaged a few men,

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bought a small quantity of supplies and started for township 51, range 21, where I had to complete the subdivision of the township. It consisted of a few miles of section line and a traverse of part of Cooking and Sisba lakes. The soil in this vicinity is a few inches of black loam with a clay subsoil and is more suitable for ranching, as great quantities of hay can be cut along the lakes and marshes. Cooking lake is very largely patronized by the Edmonton people, as a summer resort, and they have a number of tasty cottages on the south side of the lake. The wild rice in the bays is the natural feeding ground for ducks, geese and swans, and the lake is well stocked with fish. Having completed this work I returned to Edmonton and made preparations for a trip to Lac la Biche to inspect Mr. Rinfret's contract. At Fort Saskatchewan a heavy fall of snow prevented us from moving for a few days. After the storm we continued our journey by way of Star, Wostok, Andrew, crossing Saskatchewan river at Desjarlais, then to Sacred Heart and Saddle Lake. From Bruderheim to Desjarlais is settled almost entirely by Galicians. They appear prosperous as they each have a few cattle, a team of horses, and the necessary farming implements. However, I regret to say that I was told on reliable authority that a number of them had mortgaged their farms and invested the proceeds in town lots. From Saddle Lake north the trail winds around ponds and sloughs and undoubtedly was laid out by Indians. The country is very rolling and is covered with poplar and willow scrub and a few scattered spruce. The soil generally is a few inches of black loam with a clay subsoil. All along Lac la Biche and Beaver lake are located the Indian and half-breed settlers of the district. At Lac la Biche mission, which is one of the oldest in the west, is the Hudson's Bay company's trading post.

Having inspected the part completed of Mr. Rinfret's contract I moved southeasterly to Mr. M. W. Hopkins' work, examining townships 63, ranges 11 and 12 and on my arrival at Saddle Lake I received your instructions to make a few correction surveys both north and south of the Indian reservation. This I did and then moved to townships 59 and 60, ranges 1, 2, 3, 4, 5 and 6. I found the contractor at work and five townships surveyed; these I inspected and returned to Edmonton. While at Moose lake I saw a number of settlers and was told there were about thirty squatted on unsurveyed land and a few of them on the Indian hay reserve. This information I communicated to you and noticed that on my second trip you had given instructions to have it surveyed. From Moose lake to Coal lake and for about twenty miles south of Coal lake I consider the best unsettled part of Alberta. I might state that I have worked six years in the northern part of the province and never more than six weeks in the same place and therefore there is very little left of the district that I have not been over. The soil is from six to twenty inches of black loam with a clay subsoil with good water and enough prairie that a settler can get a start on, and an abundance of hay to be cut on either the highlands or sloughs. On my arrival at Edmonton I received orders to repost two other townships (51, ranges 25 and 26). When about half through this work I received your instructions for the inspection of several other contracts. It being then August 6, I made a timetable and after due allowance for bad weather to drive 1,260 miles, inspect seventy-one townships and to make two other traverse surveys, I found that in order to do the work this season it was necessary to start at once. This I did and am pleased to state that I arrived at Edmonton four days late of schedule time on four and a half months' work.

I found I could get from Edmonton to Mr. Magrath's contract, townships 7 and 8, ranges 12 and 13, with horses quicker than by train, consequently I drove. It was difficult to realize the changes in my old territory, southern Alberta, that I had left six years ago. What used to be a post office and country store on the corner of a cross-road had developed into a town of, in many places, a few thousand people, with well graded streets and good substantial buildings, and the older towns have spread themselves out on the prairie to such an extent that it was almost impossible to conceive that it was the same place that I left a few years ago. Often our old camping

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ground that was from a quarter to half a mile from town is now the residential part of the city. But it is the 'West' where people move and move quickly.

The irrigated crops are wonderful, firstly their productiveness and secondly the perfect control that farmers have over them. The principal reasons why the grains were frozen in the northern part of the province was that in the wet season the grain kept growing and did not ripen, while in the irrigated districts they have no rain and if a farmer wants his crops to ripen all he has to do is to close his head-gate or cut off his water supply and ripening commences, and at cutting time the ground is dry and the working of machinery is much easier. Having inspected Mr. Magrath's contract I moved northwesterly, passing through Taber, a new coal mining town. I did not have time to visit the mine but the geological features of the country are the same as at Lethbridge and undoubtedly it is the same seam they are working as the Lethbridge people. I crossed Belly river a few miles north of the town and then struck across the prairie about sixty miles, I came to the home ranch of the Circle outfit, and from there we had a trail to the Blackfoot Indian crossing of Bow river and to Gleichen, thence to McBeth's crossing on Red Deer river in township 27, range 17, west of the fourth meridian. This is about the centre of the south end of Messrs. Edwards', Fairchild's and Cautley's contracts. The country is very rolling except that part around the south end of Sullivan lake. Cattle ranchers say it is too rough a country for farming but on closer inspection I do not hesitate to say that at least sixty per cent is suitable for farming. The hills are long and gradual and not too abrupt to successfully and conveniently work farming machinery, except however, the centre of the west part of Mr. Cautley's work, which is extremely rolling. It consists of small round hills fifteen to forty feet high and from one hundred to two hundred yards apart. I never saw such a rolling country, in fact I did not attempt to drive across but went about fifteen miles around it. Having completed the inspection of these three contracts I moved straight north to Vegreville, passing about fifty miles east of the Calgary and Edmonton railway. All the land along this route is taken up but it has been homesteaded within the last few years and therefore farming is not advanced to any great extent. A young man wanting to pick up a homestead in a promising district would do well to go there and work out with other farmers and watch for abandoned claims. Often men make entry on land intending to farm and for various reasons, such as not having sufficient capital or getting homesick, they leave their quarter section and never return to it. Their entry can be cancelled and a new entry made. From Vegreville I moved northeasterly crossing Saskatchewan river at Brousseau thence to St. Paul de Metis, and from there to Mr. Hopkins' contract. I found the contractor still at work. I inspected the surveyed part and then moved to Mr. Rinfret's work at Lac la Biche, which I found had been completed during the summer. My next inspection was at Athabaska Landing where I had two contracts. From Lac la Biche to the Landing is forty-eight miles by straight line or a little over three hundred to go by way of Saddle lake and Fort Saskatchewan. Upon inquiry I found that the Indians have a wagon trail on the short route and on further inquiry was told that only one wagon had been over it. I therefore engaged an Indian guide and started, arriving at Mr. Cote's contract on the third day, seventeen miles east of the Landing. There is no doubt that it is the worst trail in Alberta and during warm weather it would be utterly impossible to make use of it. After inspecting Mr. Cote's contract I went to Mr. McGrandle's work which was about twenty miles west of the Landing.

The country south of Athabaska river and in the vicinity of the Landing is suitable for mixed farming. It is very level and covered in most places with light scrub. A man with a little capital to start farming here can in five years be independent. Oats are worth seventy-five cents per bushel and hay twelve dollars per ton. Everything else is about in that proportion and the prices will remain high until a railroad is constructed. It is the prairie headquarters for all freighting to the north. A farmer keeping a stopping place along the road from Edmonton said he had kept a

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record of teams freighting and estimated that there were about 70,000 tons of freight carted per year to the north country. This would average about seventy teams per day. Having completed the inspection of all contracts, I returned to Edmonton where I discharged my men and went to the hospital to recover from a bad cold. On December 16, I received your telegram to complete the survey of township 52, range 21. I engaged a few men and did this work. On its completion I returned to Ottawa, arriving there on December 24.

I have the honour to be, sir,
Your obedient servant,

G. J. LONERGAN, D.L.S.

APPENDIX No. 27.

REPORT OF A. L. MACLENNAN, D.L.S.

SURVEYS IN SOUTHERN ALBERTA.

SASKATOON, SASK., May 21, 1907.

E. DEVILLE, Esq., L.L.D.,
Surveyor General,
Ottawa.

Sir,—I have the honour to submit the following report on the surveys made by me last season in southern Alberta, in accordance with your instructions dated Sept. 11, 1906:

The district surveyed, along Livingstone river, was mountainous except a narrow strip of plateau abutting the banks of the river. The soil in certain parts of this area is suitable for the growth of cereals, but the early frosts would prohibit the maturing of the same. The water is of the very best. In nearly all the streams flowing into Livingstone river there are the choicest salmon and bull-trout.

Deposits of coal are to be seen under the conglomerate peaks of the mountains on both sides of the river.

There is considerable black pine, Banksian pine and poplar.

The short *coulées* of the mountain slopes afford excellent grazing for cattle and horses.

The entrance to Livingstone valley is through the gap made by Oldman river in Livingstone mountain, and except at high water, entrance through this gap is easily made up the bed of the stream.

I have the honour to be, sir,
Your obedient servant,

A. L. MACLENNAN, D.L.S.

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APPENDIX No. 28.

REPORT OF GEO. McMILLAN, D.L.S.

INSPECTION OF SURVEYS IN THE PROVINCE OF MANITOBA.

OTTAWA, March 23, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

Sir,—I have the honour to submit the following report on my past season's work in the province of Manitoba.

I left Ottawa on April 26 and arrived in Winnipeg on April 29. After making some preparations in Winnipeg I left for Piney to get the outfit and transport used the previous season by Mr. Grover. The horses were so thin that they could not stand hard feed and on reaching Winnipeg I was obliged to secure the services of a veterinary. I was delayed over a week there till the horses got better.

I completed my outfit on May 14 and on the next day reached Lac du Bonnet via Canadian Pacific railway. The ice had not then left Winnipeg river and I was delayed till May 24, when the ferry made the first trip across the river, and proceeded to inspect contract number two of 1906, where I arrived on the same day.

This contract includes township 14, range 12, east of the principal meridian and is traversed by Pinawa channel. This contract is densely timbered with large poplar and small spruce, the larger spruce having been cut off. In section 32 of this township there is erected a large electric power-house, the property of the Winnipeg Electric Street railway. The company has constructed a good corduroy road from Lac du Bonnet crossing as far as section 2. The soil is largely swamp except the strip bordering on Pinawa channel, which is of excellent quality. There are no people living in this township except the employees of the Winnipeg Electric Street railway. Moose and deer are abundant.

From this work I proceeded by boat up Winnipeg river to contract number three of 1907. This contract includes townships 15 and 16, ranges 14 and 15 east of the principal meridian. There are five portages including Pointe du Bois rapids on all of which fine water-power is available. Pointe du Bois appeared to me to have the best location for the development of power on Winnipeg river and it is the rapids selected by the city of Winnipeg for the erection of a power plant, and a railway is being built from Lac du Bonnet to connect therewith. The soil in these townships is, with the exception of the strip bordering on the river, swamp or rock and timbered with scrub jackpine and spruce. There is also much floating muskeg. Moose and deer are plentiful and the river swarms with fish especially sturgeon. I completed the examination of this contract and on June 29 reached the corduroy road on my return. From there I travelled to Lac du Bonnet and then by Canadian Pacific railway and Canadian Northern railway to Dauphin to examine contract number nine of 1906. The townships of this contract were so wet that I had to abandon the work after examining township 26, range 14, west of the principal meridian. I next proceeded to Gimli arriving there on July 18 and completed the addition to the townsites in eight days. Gimli is an attractive spot and at present is the terminus of the branch of the Canadian Pacific railway. There are many fishermen resident there and the abundance of whitefish in lake Winnipeg affords them ample employment.

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I next proceeded to make a resurvey of township 18, range 10, east of the principal meridian. I shipped by the Canadian Pacific railway to Selkirk and thence by boat to Fort Alexander arriving there on July 30.

This township is densely timbered except the parts improved by the farmers, and it is traversed by Winnipeg river. On both sides of the river there is a strip of excellent land, while farther back it is swampy and in some instances floating muskeg. It is not at all settled except on the lots fronting on the river. Farming is the chief industry but lumbering is carried on considerably and there are two saw-mills in the vicinity. There are several water-powers, although none have yet been developed. In section 1 is the famous Silver falls rivalling the Pointe du Bois rapids. There is an abundance of wild fruit including plums, cranberries, blueberries and other wild fruit. Moose and deer are abundant.

I completed the survey of this township on October 7, and proceeded to Manitoba House settlement.

This settlement borders on lake Manitoba and is in township 22, range 11, west of the principal meridian. It extends for about one mile in an easterly and westerly direction and six miles in a northerly and southerly direction. The lots are not uniform in size. Along the lake it is open and marshy and more remote from the lake it is densely timbered with poplar and willow scrub.

The chief industries are stock raising and fishing and much hay can be procured. The provincial government has expended considerable money on the trail through the settlement recently. I made a traverse of this trail and next proceeded to township 21, range 10 west of the principal meridian.

I made a resurvey of the sections affected by the lake lots in this township. The same conditions prevail as in township 22, range 11, except that it is more thinly settled. I completed this work on December 16, 1907.

I next proceeded to the examination of contract number nine of 1906. This contract comprises township 25, range 11, and townships 26, ranges 11, 12, 13 and 14, all west of the principal meridian. They are largely made up of swamps and sloughs separated by poplar ridges. The soil is largely of third quality and quite inaccessible in the summer season. Game consists of moose, deer, elk, wolves and coyotes. There are but six families resident in these townships. They are engaged in stock raising and live along lake Manitoba. I completed this examination on January 7 and proceeded to contract number twenty-seven of 1906.

This contract comprises townships 16 and 17 ranges 9 and 10 east of the principal meridian. The soil is of third quality being composed of large muskegs separated occasionally by sand ridges. It is densely timbered and contains some patches of valuable spruce and tamarack. It is quite inaccessible in summer. I completed the examination of this contract on January 25, 1908 and proceeded to Mr. Watt's contract. I examined five townships of this contract, townships 13, 14, 15, 16, range 13 and township 14 range 14, all east of the principal meridian. These townships are densely timbered, there are some valuable spruce in all of them. The soil is of third quality and consists entirely of muskegs, swamps and rocks. Township 15, range 13 is traversed by a railway being constructed from Lac du Bonnet to Pointe du Bois. Winnipeg river traverses townships 14, ranges 13 and 14, and at some meridian crossings is very wide. Game consists of moose, deer, foxes and coyotes. As this completed my work for the season, I stored the outfit at Lac du Bonnet on February 18, 1908 and returned to Ottawa.

I wish to express my entire satisfaction with the service rendered by my assistant Mr. W. L. MacIlquham.

I have the honour to be, sir,
Your obedient servant,

GEO. McMILLAN, D.L.S.

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APPENDIX No. 29.

REPORT OF C. F. MILES, D.L.S.

INSPECTION OF CONTRACTS AND MISCELLANEOUS SURVEYS IN SOUTHERN SASKATCHEWAN.

TORONTO, March 17, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

Sir,—I have the honour to submit the following general report on my field operations during the past season in the province of Saskatchewan, comprising inspection of subdivision contracts, surveying of townsites, resurvey of townships, and investigating and correcting some differences between settlers under instructions, bearing date respectively April 5, April 24, July 17, August 21, September 6, September 18, October 1 and November 6.

Owing to my outfit being wintered about thirty miles southwest of Calgary, I engaged a man to go to Calgary. He left Toronto on April 16, arriving at Calgary on the 20th. Here he hired another man to assist him in bringing in my outfit to be shipped to Moosejaw. They loaded it on a car on the 23rd and arrived in Moosejaw on the 28th, the same day I arrived there from Toronto. We got under canvas the following day, had the horses (which were in very poor condition after one of the most severe winters that had been experienced for some years), shod, fed up, and repairs made to my wagons, harness, &c., &c.

In the meantime, I sent out some men to bring in the horses and outfit used by Mr. Warren, D.L.S., last season from Mr. Nicolle's, Buffalo lake. They returned on the following day, accompanied by Mr. Nicolle, who had the wintering of the outfit, but one mare was missing. According to your instructions, I turned the horses and outfit over to Mr. C. C. Smith, D.L.S., together with three pack saddles of mine, that he could make use of in his mountain work. On account of the mare being missing I did not pay Mr. Nicolle's charges for wintering. I informed him that I would have to submit the matter to the Department, more particularly, as it appeared to me his charges were excessive. I had several communications from him since but as he could neither produce the missing mare, nor prove her death, I did not feel justified in satisfying his demands.

The trails, all the time, were in very bad condition for travelling, the prairie being flooded for miles in the lower places. However, we broke up camp at Moosejaw on May 8, and made a start for Chaplin to lay out a townsite, having ascertained that the trails to the south were almost impassable. Snowstorms were of daily occurrence on the trail to Chaplin, where we arrived on May 10, going through numerous drifts of snow, necessitating our taking to the hills most of the way. Up to Parkbeg from Moosejaw, about forty miles by trail, the country is pretty well settled, beyond this point it becomes very sandy with but few settlers' houses visible from the trail, which runs parallel to the Canadian Pacific railway.

Chaplin is a small railway settlement with probably little more than fifty inhabitants, most of whom are connected with or dependent on the railway. There is a tank here, the water of which is brought by gravitation from springs in the hills, about one mile to the north. This is also a coaling station; the old sheds were being replaced in the fall by coal chutes. To the south, lake Chaplin approaches within half a mile

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of the village and between the village and the lake there are no settlers. To the north for about sixteen miles it is rather sparsely settled beyond that the soil is much improved, and settlers are plentiful, a number of new ones coming in while we were camped there. While making a preliminary survey of the outlines of section 29, township 17, range 5, west of the third meridian I ascertained that the pipe carrying the water from the springs to the tank at the station was not on the water-right of the Canadian Pacific railway in the westerly half of parts of sections 29 and 32, but on the easterly half, whereupon I communicated with the Department on the subject and also about crossings which had not been located by the Canadian Pacific railway. Receiving a reply from the Department not to delay on that account, I broke up camp at Chaplin on June 4, and took the trail for Moosejaw, arriving there on the following Monday. Here we laid in a fresh lot of supplies, oats, fuel, and lath for pickets, and left for the south on June 5.

There is a fairly good trail to the south leading to Wood mountain, Northwest Mounted Police post. About sixteen miles out a trail branches off leading to Willowbunch, this being the regular mail trail, the mail being carried twice a month from Moosejaw to Willowbunch, and thence to Wood Mountain outpost. A government telegraph line runs parallel to the trail as far as the outposts, thence to Willowbunch, its terminus. We arrived at section 11, township 10, in range 30, west of the second meridian on the following day, where we camped beside a snowbank in a ravine, water being rather scarce in that immediate vicinity. We examined the work in several townships of contract No. 25, of 1906, and found that this contract was unfinished, many of the monuments not having been completed. From here I also ascertained that the pits had not been dug in contract No. 13, in range 1. From here we moved south and examined the townships in contract No. 10, of 1906, lying west of 'Lake of the Rivers.' There are extensive alkali flats to the south of this lake, traversed by a small creek, without any current at that time. The lake lies between banks from seventy-five to one hundred feet high, and this depression continues beyond the lake for many miles, in a southerly and easterly direction, the bottom being more or less alkaline, averaging over half a mile in width. I have followed this valley myself for nearly sixty miles to township 8 in range 23, and am told that it continues beyond. I had to take my outfit around by the southerly tier of sections in township 7 to avoid this flat, and the ravines running into it. Although the land in these townships was opened for settlement only a few months ago the majority of the homesteads are entered for. After examining the remaining townships east of 'Lake of the Rivers' in this contract, and ascertaining that in township 9, range 28, the monuments had not been completed, I started north on the Willowbunch and Moosejaw trail on June 22. This trail traverses a very hilly country up to within about ten miles of Moosejaw. My outfit arrived in Moosejaw on the 24th and the following afternoon, after laying in some new supplies and having repairs made, we left on the trail running north to Tuxford, the present terminus of the northwestern extension of the Canadian Pacific railway from Moosejaw. Tuxford, of very recent origin, is quite a thriving village, with several elevators, stores, &c. Another village called Brownlee is situated about the northwest corner of township 19, range 29, west of the second meridian. It started only the past year, and has already a number of stores, hotel, and other buildings. The homesteads along here are all taken up, and also most of the company lands are occupied.

I completed the resurvey of township 21, range 1, west of the third meridian, and on July 9, moved camp from section 16, township 21, range 1, to section 9, township 23, range 3. Here I reran the lines south of Sana lake and the Qu'Appelle which is a very small stream in this township. Between the lake, the river, and the adjacent banks this township is pretty well cut up. The soil is light and only the southerly tier of sections settled upon. Finding more than one monument at many of the corners, I abandoned this work for the present, until I could communicate with the

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Department, and on July 15 moved camp to section 9, township 24, range 1, west of the third meridian. This township is fairly well settled, most of the homesteads being occupied. From this township there is a good graded road that leads into Craik, a village of probably five hundred inhabitants, on the Canadian Northern railway, about seventy-two miles northwest of Regina. There are several elevators, stores, hotels, and a bank here, and settlers come from quite a distance to trade. I finished the resurvey of township 24, range 1, on July 24, and moved camp the following morning to section 21, township 24, range 2. I worked but a few days in this township when your telegram was received instructing me to proceed at once to contract No. 13, of 1906. We started on July 29, and arrived at Swift Current on August 2, but owing to heavy rains, only reached township 11, in range 12, west of the third meridian on the 5th. Between Swift Current and this place we passed through a well settled country, there being quite a large settlement of Mennonites, who occupy about half a dozen villages (some not more than a couple of miles apart) in that district. Most of them came from Manitoba, and being frugal and industrious, they appear to prosper wherever they settle.

In the westerly portion of this contract No. 13, of 1906, I examined the remaining four townships, viz., 11 and 12 in range 12, and 10 and 11 in range 13; the surface is high, rolling and well adapted for ranching; a fine creek runs through the northerly part of township 11, range 12 fed by springs in the adjoining township to the west. There are but two or three settlers in these four townships; one of them in township 11, range 12, is a rancher; he has both horses and cattle. This section of the country appears well adapted for this business. The other settler was a more recent arrival and had but a small outfit; but all appear sanguine of success. Having lost a horse while in township 24, range 2, I purchased one from Mr. Alfred Russell, the rancher above mentioned. We broke up camp again on August 10 and started for the easterly portion of contract No. 13. We crossed Mosquito creek during the morning, and some time in the afternoon made the 'Turkey Track,' 'Brand Bull' and 'Hay Camp,' the 'Home ranch' being about twelve miles to the north. It was this ranch which met such very heavy losses during the past severe winter. They were supposed to have by book-account, some 18,000 cattle, but, I am informed, they rounded up last spring not more than one-third of that number. The losses by the ranches in this district all through were very heavy. After crossing Notukeu creek at the 'Hay Camp' we struck the old Fort Walsh to Regina trail, pretty well obliterated, and followed this for a couple of days, which brought us to the French Canadian settlement on Wood river. The country we passed through is mostly rolling prairie, and south from the creek appears very dry. There were no settlers met with until we neared Wood river. On account of the water being scarce, and not knowing whether we would meet with any more, we camped here, and the following afternoon reached section 2, township 10, range 1. I succeeded in taking an observation the same evening. While camped here near the Wood mountain trail we were often visited by homestead seekers, who were anxious for information on many different subjects, as to trails, homesteads, soil, water, fuel, etc., etc. Townships 7, 8, 9, 10 and 11, in range 1, in this contract are more or less rolling prairie, township 10 being somewhat hilly, interspersed with ponds. The nearest wood for fuel may be obtained about forty miles to the south, and the nearest coal in township 7, range 27, west of the second meridian, probably a distance of fifty miles by trail, it being situated at the east of 'Lake of the Rivers.' From here I sent a team to Moosejaw for supplies, including also some wood for fuel. I finished the examination of this contract (No. 13) on August 23, and on the following day moved camp to section 7, in township 6, range 29, to contract No. 17 of 1907. The outer edge of Wood mountain extends to this place and the surface is comparatively rough and hilly, ravines are frequently encountered containing timber, mostly poplar of not very large size, but settlers from a considerable distance come here for their fuel, and also for fence poles. The soil is principally a sandy loam. There are a few settlers in the

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valley, most of whom are French half-breeds, who possess small herds of cattle and a number of horses, not much land being cultivated. I completed the examination of this portion of contract No. 17, on September 6, and moved camp to Willowbunch village on the following day. Here we got additional supplies, oats, etc., etc., and left again for the east on the 8th. At Holliss' on the 'Big Muddy' about sixteen miles southeast of Willowbunch, I split up my party and sent my assistant with six men down the trail along the Big Muddy to the international boundary, thence to townships 1 and 2 in ranges 17 and 18 west of the second meridian, where they arrived on the 10th. On the creek near where it crosses the boundary there is an outpost of the Royal Northwest Mounted police; their camp is close to a seam of coal from where they draw their supply of fuel. All this country is well adapted for ranching, water and feed being in abundance. These four townships are more or less hilly and stony, the soil consisting principally of a sandy loam. Leaving Holliss' on September 8, we travelled east along the big valley before mentioned for about fifteen miles to a house on the south side of the valley. As we had come across no monuments we visited it and found it occupied by a family from one of the provinces in eastern France. They had been there less than a year, and not having any near neighbours had not acquired the English language. They have a comfortable house shingled and painted, a good stable, and a large quantity of hay. They own five or six horses, and quite a number of cattle. The next morning one of the men took us to some pits which were on the south boundary of section 3, township 4, range 24. A good deal of hay has been cut along the edges of the valley, but out towards the centre it is mostly hardpan, with but little vegetation. I examined townships 4 ranges 23 and 24. The surface is rolling prairie and the soil black loam with, in many instances, a gravelly clay subsoil. A number of horses were seen here at large, grazing in the marshes, but, as there are no settlers in these townships, they may be owned by some ranchers to the southwest. We moved camp on September 12, to Willowbunch about twenty-five miles westerly. It was a cold day and showery, varied by hail, and a slight flurry of snow, the first of the season.

On the 18th, when my assistant and party joined me we left Willowbunch for townships 9, ranges 26, 27 and 28. About seventeen miles distant the Moosejaw trail crosses that alkaline valley before alluded to. It runs from 'Lake of the Rivers' to Willowbunch lake, and I was gratified to see a gang of men employed fixing up the trail across the flat. It used to be a bad place, so many teams getting mired in it. When I first crossed it in June, a wagon was still standing there, where out of a team of four horses, two had been drowned. Now there is a bridge and the approaches are considerably raised. As there is a good deal of freighting on this trail it will be a boon to freighters and travellers. We camped at a place called 'Bickner's,' a deserted house, where a man by that name had homesteaded on a wrong (an odd) section. Here we split up again, my assistant, with cook and five men, going to townships 9 ranges 25 and 26, while I followed up the Moosejaw trail, as far as townships 9 ranges 27 and 28. It passes through pretty good country, there being a few settlers between it and 'Lake of the Rivers.' In ranges 25 and 26 there are some alkali lakes, the soil in the sections surrounding them generally being sandy and gravelly. In township 9, range 27, also part of contract No. 17, the surface is rolling and the soil a black loam with a clay subsoil. Township 9, range 28, is a part of contract No. 25 of 1906. The land is similar to that in range 27. On September 22 I was joined by my assistant and party at 'Bickner's' and then we camped at a spring on section 35, township 7, range 28. This spring is situated on the north side of the alkali flat before alluded to, and is somewhat strongly alkaline. I sent a man along the flat south of 'Lake of the Rivers' and he reported that with teams it would not be possible to pass around the lake. So, on the following morning we went back to the Moosejaw trail, and struck south along the new road constructed across the flat. It was a long detour, but we managed to make camp the same evening on the southeastern quarter of section 5, township 10, range 29, this being in contract No. 25 of 1906. On the

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way we passed quite a number of empty shacks, holding claims of homesteads some of which had been blown down, and completely demolished. We also passed a settler who had come there only in the spring; in the meantime he had built a house and stables, put up a large quantity of hay and had harvested a good crop of oats, besides breaking up a good many acres. This is on section 18, township 8, range 30. After examining of this contract (No. 25 of 1906) we moved west on the 25th to examine the extension of the same contract on Wood river, where there were four townships to inspect. Here there is quite a large colony of French Canadians. There is a priest domiciled amongst them, but they were still worshipping in a large tent on the east side of the river, which is now spanned by a bridge on the third correction line. Much of the material for the church, which is to be erected on the west side of the river, was already on the spot, and the building by now is probably in course of erection. There is also a post office established under the name 'Gravelburg' not far from the church site. A number of comfortable houses had been put up and large piles of wood for fuel which had drifted down the stream from the hills were observed beside the dwelling houses. Considerable areas of breaking also had been done, and was in progress of being done. After examining this contract we continued the inspection of the extension of Mr. Parson's contract (No. 17). There were ten townships lying on both sides of Notukeu creek. They are good townships and well adapted for settlement. They are mostly undulating prairie, the soil being black and sandy loam, with a clay subsoil. We moved camp on October 1 to section 18, township 12, range 6. My assistant with part of the party moved across to the north side of Notukeu creek, while I moved west. We completed our examination here as far as the subdivision had progressed, and on October 5 we all set out together for Mortlach, on the main line of the Canadian Pacific railway, where we arrived on the 7th. After crossing Notukeu creek at the French settlement, on a bridge recently constructed, there is a good trail; we followed north along Wood river for some distance and then turned north on a trail leading through the hills. Here we passed several settlers who are interested in cattle raising. There is good pasture and also good springs, and it is therefore well adapted for cattle raising, hay also being plentiful. When we reached the northerly edge of the hills a very fine view presented itself, a flat extending up to Mortlach dotted with homesteads and stubble fields, over which thousands of wild geese were hovering. Descending into the valley, and passing the stubble fields, flocks of geese arose, alighting again in some more distant fields. At Mortlach I had the horses shod, and then moved on to Chaplin, where I changed the Canadian Pacific railway water-right from the westerly half of the north half of section 29 to the easterly half, and also made a change in the survey of legal subdivision 11 of section 29. Having finished the work at Chaplin on the 14th we proceeded to Ernfold to lay out a townsite of that part of section 21, township 17, range 7, west of the third meridian, lying south of the Canadian Pacific railway right-of-way. From here, on the 16th, my assistant with cook and four men returned south to range 2, to examine townships 7, 8, 9, 10, 11 and 12, being an extension of Mr. Parson's contract (No. 17), which work was not ready for inspection when we left that vicinity on October 5. Completing the survey of Ernfold townsite, we started again for the south on the 21st, passing through another flourishing Mennonite settlement, and camping on their premises one night. Heavy fire had passed through here a few days before consuming nearly all the pasture. At this point, however, this settler had saved the pastures on two sections by very hard work. The next night we reached a ranch where there was any quantity of hay at our disposal. There were probably between four and five hundred tons, much of it the former season's hay. The following morning after crossing a bleak and black range of hills we reached the home ranch of the 'Turkey Track Brand,' where we were also entertained, and got accommodation for the horses. That evening we reached their hay camp, about twelve miles south. From here I inspected the four townships 11 and 12, in ranges 9 and 10. They are mostly undulating prairie

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with sandy and clay loam soil. We completed our inspection here on the 26th, and left again for the 'Home ranch.'

From here we went north across hill and dale and burnt prairie direct for the nearest point on the Canadian Pacific railway. We arrived at Herbert on the 28th, and thence followed the trail along the railway to Morse, a comparatively new town, with stores, hotel, livery stables, etc., etc. The whole party on the 30th went north again from Chaplin, for township 24, range 1, west of the third meridian. I took the train for Regina, thence to Craik, where two of my teams were to meet me. These arrived there on November 2. With three men I left Craik for Mr. Dennis' place on section 20, township 23, range 25, west of the second meridian. We passed through a small town, Aylsworth, on the Canadian Northern railroad, where there are two elevators, and there were probably over fifty teams waiting to turn their wheat into these. I have already reported to you on my work on the east boundary of township 23, range 26. We finished this work and returned to Craik on November 7, reaching the main camp on section 9, township 24, range 2, on the following day. From here we completed the resurvey of this township and of the adjoining one, township 23, range 2. The former township is well settled, except those homestead sections bordering on the west boundary of the townships where the land is very sandy and bushy. On November 15 being in Craik, I received your instructions to inspect D.L.S. Waldron's contract (No. 25) of 1907, and on the 19th started four men with part of the outfit for Gull Lake, where I with my assistant, would overtake them by rail. We, in the meantime, completed resurvey of township as indicated above. We overtook the outfit at Gull Lake on the Canadian Pacific railway on the 26th but owing to the non-arrival of our camp outfit, we could not leave for our destination until the following afternoon. There are a number of settlers along the trail south to township 8. On section 36, township 8, range 20, west of the third meridian, there is located one French family recently arrived from France. There were seven in the family, and none of them could speak a word of English.

South of these no settlers were met with. We camped that night on a lake at the southeast corner of section 2, township 8, range 20, the only water then in sight from this camp. We inspected townships 8, ranges 19 and 20 and the following day moved camp east to section 14 township 8, range 18 on a fine little creek, where a patch of probably one hundred acres had escaped the fire. From here I examined several sections in townships 8, ranges 17 and 18. There being no feed for the horses I did not proceed any farther east, but moved west to Stearn's ranch on the southwest quarter of section 20, township 8, range 20. The westerly half of this township is somewhat rough, broken by creeks from the hills as is also township 8, range 21. There are a number of settlers ranching on a small scale, along the eastern slope of Cypress hills it being well adapted for cattle or horse raising. There is abundance of good water, good pasture, both at the base and on the top of the hills, and shelter in the ravines which are more or less timbered. The easterly halves of township 8, range 19, and township 8, range 20, are undulating, rolling prairie, and are well adapted for mixed farming, the soil being sandy loam and black loam, in many places eighteen inches deep. Townships 8, ranges 17 and 18 are hilly and fairly well watered, the soil consisting of both black and sandy loam. We completed the inspection of this contract (No. 25 of 1907) on December 4 and the next morning started on our return to Gull Lake. The trail was good both going and coming; but at the crossing of Swiftcurrent creek there are bound to be difficulties at that time of the year. The stream there is not more than about two rods wide. It was frozen over and the ice in midstream was covered with a foot of water. The troublesome part was getting the horses, whose shoes had worn smooth, across the ice. After that we could manipulate the wagons with ropes and long chains. We arrived at Gull Lake the same evening. I may mention here that although the station on the main line of the Canadian Pacific railway is named Gull Lake, the lake itself is a few miles to the

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south. I may here also mention that while on our way to the railway on December 5 we saw two men on mowers cutting hay. It was a very fine day so that it did not appear so much out of season. From here I took train for Swiftcurrent station where I was obliged to remain for the night, and thence to Chaplin, where I awaited the arrival of my outfit which got there on December 8.

Some of my men were paid off, and on the following day with only a small party I started by train for Weyburn, where we arrived late on the evening of the 10th. Here I hired a conveyance, and we drove out to the southwest quarter of section 34, township 6, range 14 west of the second meridian, where we camped in a vacant house. Here I retraced the east boundaries of sections 28 and 33, and in measuring north from the northeast corner of section 21, I found the error in the first mile.

We returned to Moosejaw and Chaplin on the 13th, where I found your telegram instructing me to return south to re-examine contract No. 10 of 1906. Up to the present the weather had been fine, and what little snow had fallen had disappeared again, so I had no hesitation in going south with wagons. My outfit left Chaplin on the 14th, and after having the horses sharp-shod at Moosejaw, I left there on December 17 by the Willowbunch trail, with three teams and five men. Proceeding south, the snow became deeper, and travelling heavier. At the head of 'Lake of the Rivers' we took to the ice and travelled along the lake for about twelve or fourteen miles, reaching Bickner's on the northeast quarter of section 1, in township 8, range 28. There I re-examined four townships. We then drove west along the alkali flat south of 'Lake of the Rivers,' which was impassable during the summer, to section 24, township 8, range 30, there being about a foot of snow, and no feed for the horses, I stabled them at Mr. Lee's on section 18, township 8, range 29, as he had a good supply of hay. From here we moved to township 7, range 30, where we arrived on Christmas day. There we completed the re-examination of this contract. Although there are not many settlers in these townships just now, yet most of the sections available for homesteads are entered for and many small shacks were erected during the summer, which probably will be occupied by next spring. Another reason why an impetus will be given to the early and rapid settlement of these townships is the fact of the proposed railway between Weyburn and Lethbridge having been located all along township 8, nearly as far as the eastern slope of Cypress hills, where the line diverges to the south. I would have gladly re-examined part of contract No. 13, but for the difficulties of moving about with wagons in the snow and the scarcity of fuel.

I have examined five contracts, comprising seventy-two townships and have reported on sixty-nine of the same, besides which I made a restoration survey of three townships, surveyed two townsites on the main line of the Canadian Pacific railway and made some minor correction surveys. In order to reach these various places, the distance travelled by my outfit was about 2,200 miles, which does not include the mileage from the various camps to work and return, day by day. I finally returned to Moosejaw on December 30, stored part of my outfit there, and sent the horses with the remaining part to Chaplin, thence taking the horses to a homestead in township 21, range 5, west of the third meridian, where one of my men had made preparations to receive and winter them. After paying off the last of my men I arrived home in Toronto, on January 10.

I have the honour to be, sir,
Your obedient servant,

C. F. MILES, D.L.S.

APPENDIX No. 30.

REPORT OF W. F. O'HARA, D.L.S.

SURVEYS IN SOUTHERN ALBERTA.

OTTAWA, ONT., January 1, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report upon my work for the season of 1907 :—

I left Ottawa in April for Pincher creek, Alberta, where I organized a party. My work generally was greatly retarded by incessant storms and heavy rains. The roads were almost impassable from the town to the foothills of the Rocky mountains where my work was. It was necessary to resort to the use of pulley, block and tackle, using great mechanical power, to move my outfit in many places.

The work consisted of the production of the second base line across ranges one and two, west of the fifth meridian, and the subdivision of the adjoining townships.

The country generally in this region is very rough and mountainous, there being very little land suitable for agriculture. The chief industries consist of lumbering, mining and drilling for both gas and oil. There is evidence of an oil field on the east slope of the Rockies containing an area of about 1,800 square miles.

Already several companies, which have been operating there, have met with much encouragement, but it may require several years to properly develop the industry. Their progress will be watched with great interest, because I understand from tests which have been made that the petroleum found is of the highest grade. It will be necessary to drill at least 3,000 feet, before large supplies can be obtained. If the early operators meet with anything approaching the success they have reason to expect, there will be a rush of speculators into that part which will greatly boom southwestern Alberta and the production of high grade petroleum may become one of the chief industries of the province.

Coal also exists in large quantities but the fields have not yet been developed to any extent in that part of the country, although small quantities are being mined for local use.

Townships 4, ranges 2, 3 and 4, west of the fifth meridian consist almost entirely of lofty and rugged mountains, and great difficulty will be experienced in subdividing them. The townships are included in the petroleum field. Oil-rock outcroppings were observed on Southfork river, Gladson and Mill creeks, and no doubt this evidence will be followed later on by sinking wells in likely places on these streams, in the above mentioned townships, which are now in unsurveyed territory. It will be scarcely possible to follow the provisions of the 'Manual of Survey' here. In the first place, road allowances surveyed in the regular way, are useless. This applies to large parts of townships 5, ranges 2 and 3, where a system of reserving about two and one-half per cent of the land for roads would be much more suitable for the locality. The best method of surveying the townships above mentioned, would be to lay out roads in the valleys following the best natural grades. The lines should be well opened out, carefully traversed and measured, planting hubs or posts

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at every deflection. These then could be used as base lines, in conjunction with a system of triangulation for the purpose of determining distances throughout the townships. Owing to the broken and mountainous character of the country, it will be found a physical impossibility to chain the lines of the sub-division work, although they can all be transited. The work generally would be within the sphere of a topographical survey rather than treated and surveyed under the third system of survey. The work of surveying roads where they can be travelled seems to be left to the local government, and in the meantime there is no end of trouble among the settlers, who close up wagon trails which pass through their respective farms, and which have been broken in best places and travelled for some years. The public, therefore, under these arrangements are obliged to turn into some swamp or ravine, where they find great difficulty in travelling. Whereas if a settler or homesteader obtained a title to only 97½ per cent of the area within his quarter section limits the rest being reserved for a highway, he would have no voice in the matter if his land happened to be situated in a valley through which the public had established a highway.

Hay, oats and hardy vegetables can be successfully grown in the valleys where the soil consists of a rich black loam and clay, but at present the crops are rather risky. After a large area is opened and broken, the climate is likely to become more moderate and wheat can then be more successfully grown. But at present summer frosts injure all tender crops.

Agriculturists will therefore do better by confining their attention to the more hardy crops for a few years, before going extensively into wheat growing.

The hog and dairy industries are greatly neglected in southern Alberta. Both pork and butter are selling too high every year. Vegetables are also in great demand, large quantities of which are shipped there in cans, and no person seems to supply the demand.

Prices of potatoes, carrots, onions, cauliflower, cabbage, turnips, parsnips and celery are three or four times higher than those in Ontario, and all these vegetables will do well in southern Alberta. Nearly every settler who takes up land grows hay and oats, and raises a few cattle or horses, never thinking of how well a crop of celery or cauliflower would sell; whereas if farmers properly farmed or gardened a smaller area as they do in Ontario, there would be much more prosperity in the country, in the event of a crop failure, than at present when everyone is depending upon the success of one crop.

The season was unusually wet during the summer which greatly retarded our progress. The bad weather culminated with the most severe storm of snow I ever experienced. We were camping in township 5, range 2, at an altitude of 6,000 feet during the storm, which began on the morning of the 10th of September, and lasted until the evening of the 13th. During the night of the 10th the greatest precipitation occurred, there being about two and one-half feet of snow in the morning of the 11th. After the storm subsided the depth of snow averaged from three and one-half to five feet. The wind was from northeast and the barometer was unusually high. On the night of the 10th the storm was accompanied by flashes of lightning which occurred at remarkably equal intervals of about fifteen seconds, and judging from the time elapsing between the flashes and the thunder, the electrical disturbance must have been about two miles away. I made a great many inquiries and no one in the neighbourhood experienced a flash any closer. Therefore the storm must have been at an altitude of about 16,500 feet, which accounts for the extreme height of the barometer. Were it not that the atmospheric pressure was so great clouds could not have been supported at so great a height. The great depth of the snow falling in so short a time is also evidence that a strata of the atmosphere of very unusual thickness was discharging moisture.

The crops of wheat and oats which were very late and remained uncut were completely buried. Not a head could be seen and it looked at one time like a total loss.

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However, after a few days the snow melted and some ingenious men came to the rescue by devising some specially long lifters, attachments placed in front of the knives of the binders and mowers, which lifted the straw, so that the crops could be cut. The final outcome of the agricultural pursuits were on the whole satisfactory, on account of the prevailing high prices, due to crop damage in other parts of the world.

I have the honour to be, sir,
Your obedient servant,

W. F. O'HARA, D.L.S.

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APPENDIX No. 31

REPORT OF W. R. REILLY, D.L.S.

RETRACEMENT AND RESTORATION SURVEYS IN NORTHERN SASKATCHEWAN.

REGINA, February 25, 1907.

E. DEVILLE, Esq., L.L.D.,
Surveyor General,
Ottawa.

Sir,—I have the honour to submit the following general report concerning my operations in the field from August 5 to December 9, 1907, pursuant to your instructions of July 15 and subsequent dates:—

Your instructions were to organize at Saskatoon and apply to R. H. Hall, Esq., manager, Hudson's Bay Company, Prince Albert, for surveyor Wallace's horses. I communicated with Mr. Hall at once and received a reply.

I left Regina on August 5 and expected the horses would be in Saskatoon by the time I arrived there. Owing to the fact that a letter to Mr. Campbell who had care of the horses was addressed to the wrong post office the horses were not delivered to me until the 8th. In the meantime I had everything in readiness except the rigs.

I experienced some difficulty in procuring a cook. I was at a disadvantage in procuring this help, as both the Canadian Pacific railway and the Grand Trunk Pacific railway were paying much higher wages for the same work on their construction survey parties than my instructions allowed. On the arrival of the five horses, which turned out to be small ponies not in the best condition, I purchased another pony, the only one available at a reasonable figure, and three democrats. To have purchased lumber wagons would have been a great mistake, as a wagon alone would have been load enough for these small ponies.

When working on contract work I used democrats. I found that I could transport with ease loads that I could not have handled on wagons with the same horses. These ponies had been used to packing and required breaking in to harness. I started them out with light loads and soon had them going all right.

We left Saskatoon on August 9 to mound townships 41 and 42, range 27, west of the second meridian. We crossed the river at Saskatoon and proceeded by trail northeasterly to Aberdeen on the Canadian Northern, along the railway to Vonda and northeasterly from Vonda into township 41, range 27, which was mounded first, then into township 42, range 27. The trail from Saskatoon passes through a good country for grain growing and mixed farming. Some very fine growing wheat and oat crops were seen along the route. The best were within a short radius of Aberdeen and Vonda. Like the majority of crops in the province they were damaged by frost later on. The mounding in township 41, range 27, was completed on the 20th and in township 42, range 27, on August 26. These townships are similar in character. The surface is rolling to hilly with numerous sloughs and small lakes and is more or less dotted or covered with poplar bluffs and willow brush. The soil is mostly a good sand loam. Some homesteads are very much broken by lakes and hills. A large majority of the homesteads are settled on by Galicians. These people are farming so as to produce the most of their living direct from the farm. They started with small means and are gradually making comfortable homes for themselves accord-

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ing to their way of living. Scarcely any of the odd sections are settled on and these people are not likely to purchase odd sections for some time.

After completing the work in this district on August 27, we started for township 34, range 6, west of the third meridian, to complete the survey and mounding of that township. The trip as far as Saskatoon was made over the same trail we came up on over two weeks previous. The change in the crops in that short time was remarkable. They bid fair to produce a good yield but were frosted later on. The weather during the growing season was ideal. The damage by frost was not on account of an early autumn, but rather attributable to the very late season. In ordinary seasons grain would have been cut at the time of the most damaging frosts. Wheat sown very late is almost certain to be frosted in any season.

The lines surveyed during the season were nearly all retracements and we ran random lines, being the most practical and expeditious way of carrying on the work. We arrived in township 34, range 6, on August 29. We completed the lines and mounds on the east side of the river, then moved to the west side crossing the river at Saskatoon. On September 12 it snowed to the depth of two inches during the night; this made it disagreeable for a couple of days, after which we had ideal weather.

South Saskatchewan river runs northerly through this township from section 2 to section 33. There is a very wide valley or river flats skirted on the west by a range of hills through the centre of sections 5 to 32, on the east by hills northwesterly from section 1 to 27, and northeasterly through section 35. A large portion of the land in the flats is good farming land, while that on the hills is light sand, fit only for grazing. I completed the survey and mounding of this township on September 18, and started on the following day for township 38, range 13, to make a retracement in that township according to instructions dated July 27.

From township 34 I took the direct trail from Saskatoon to Asquith on the Canadian Pacific railway and northwesterly from there until I struck the old Hudson's Bay company's trail which runs through township 38, range 13.

I finished the retracement on September 24; a sketch and report of the work was sent in later. I started the next day for township 51, range 27. We were in the north part of township 38, range 13, which was pretty rough. I experienced some difficulty in getting west to strike the north trail, the most direct route to Battleford. I passed through Battleford, where I procured some necessary supplies.

After making some inquiry I purposed taking the old Hudson's Bay company's trail to Fort Pitt, the most direct route to the work. At present the trail for a long way out of Battleford is destroyed or fenced in and I had to take a trail leading from one station to another on the Canadian Northern railway until after I had passed Paynton, where I crossed country and got on the Pitt trail which is very little used now. I arrived in township 51, range 27, on September 3.

I went up this trail to the same township in 1884. Apart from settlement the general features of the country have not changed much since that time. Fire has destroyed many bluffs, and while others have grown up they are not so heavy. The most noticeable feature is the change in water areas. In 1884 all sloughs, ponds, lakes and creeks seemed to be at high water mark. These are now much lower and some have entirely disappeared.

In accordance with instructions dated August 8, I made a retracement and restoration survey of the outlines, interior meridians and crosslines of townships 51 and 52, range 27, and of township 53, range 27, with the exception of the west and north outlines, which were retraced by G. J. Lonergan, D.L.S., in 1906.

Township 51 is cut by Big Gully creek. The surface is from rolling to hilly. It has many small sloughs and lakes and numerous bluffs of poplar scattered all over the township. Township 52 is very similar to 51 but not quite so rough. These townships contain a good deal of fair farming land and a number of settlers have taken up

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homesteads and are doing fairly well. This district is not a grain district but rather a mixed farming or cattle country.

A large part of township 53 is rough and hilly. It is cut by Saskatchewan river from section 19 to section 1. All south of the river is hilly and north of the river rolling to hilly. Sloughs and lakes are scattered all over the township with scattered bluffs of poplar south of the river, and large stretches of spruce, tamarack and poplar north.

According to instructions dated September 4, a portion of two lakes, one in section 1, the other in sections 12 and 13, township 52, range 1, west of the fourth meridian were traversed and fractional townships 54, ranges 27 and 28 west of the third meridian subdivided. This survey which completed all our work in this district was finished on November 28.

On the following day I started for Lloydminster. On the way in I made arrangements with Mr. Chas. Hayes, section 20, township 51, range 27 for the storing of the transport goods and the wintering of the horses. On arriving at Lloydminster four of the men wished to go to Edmonton; these I paid off. The other six I took to Saskatoon by rail. Two of them were paid off on arrival.

Instructions dated October 26 were to revisit township 38, range 13, west of the third meridian for further retracements.

The intention was to go by rail to Asquith and hire a rig there for a trip to the township. As the Canadian Pacific railway had not started their train service I hired a first-class team at a low rate from Saskatoon, took three men and a cook with me, made the trip, did the work and returned to Saskatoon on December 8. I paid off the men on the following day.

The weather was exceptionally fine during the season's work (from August 5 to December 9), which took me over a district of 175 miles east and west, 125 miles north and south, in the heart of the fertile belt of northern Saskatchewan. A flurry of snow on September 12 was the only snowfall until December 7. Saskatchewan river did not freeze over for safe crossing until November 25.

Looking back over a period of twenty-five years, it is safe to say we never had a season when stock (especially horses and cattle) would not do well on the open run. On the other hand we have had many failures of grain crops. To raise wheat for market seems to be the all absorbing ambition of the majority of farmers. Large tracts of open plains are well adapted for exclusive grain growing, but this class of farming is more or less an uncertainty as either frost, hail, hot winds or drouth have time and again spoiled the promise of a good harvest. On the other hand stock raising and mixed farming is to a large extent free from these damaging elements, and present a surety of success which exclusive grain raising does not warrant.

I have the honour, &c.,

WM. R. REILLY, D.L.S.

APPENDIX No. 32.

REPORT OF GEO. ROSS, D.L.S.

SURVEY OF A PART OF THE FOURTEENTH BASE LINE BETWEEN THE FIFTH AND SIXTH
MERIDIANS.

WELLAND, ONT., March 6, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit my report on the survey of the fourteenth base line westerly from the east boundary of range 13, west of the fifth meridian, to the sixth meridian.

In accordance with the suggestion made by you in a letter dated January 12, 1907, that it would be advisable for me to make a preliminary trip to Edmonton, in order to arrange for the forwarding of supplies to a suitable depot, towards the western end of the line to be run by me, as they could be freighted much easier and cheaper by sleighs in winter, than by packhorses, over soft trails in summer and in order also to purchase packhorses, as these animals would in all probability be hard to procure during the following spring, I left Welland, on January 31, 1907, for Edmonton. While there I purchased the greater portion of the supplies required by me during the following season, and arranged to have them forwarded to Big Eddy on McLeod river, and I also arranged for the purchase of twenty packhorses. I returned home to Welland on February 25.

On May 27, I again left for Edmonton, and arrived there on the 31st of that month. I organized my party in that city, purchased the balance of my outfit and supplies and took the trail for Lac Ste. Anne on June 10, where we arrived on the evening of the 13th.

From Edmonton to Lac Ste. Anne there is a fair wagon road, and I engaged a freighter to assist us by taking two wagon loads as far as Lac Ste. Anne, from which point we proceeded west with the aid of our packhorses alone, leaving at Lac Ste. Anne, to be forwarded to us, in about ten days, such portion of the outfit and supplies as could not be taken along without overloading the horses.

On the night of June 12 and during the greater portion of June 13 and 14 there was a heavy and steady rain, and the trail was becoming wet and sloppy. About noon on June 15 we left Lac Ste. Anne by the Yellowhead Pass trail and arrived at the crossing of Pembina river on the evening of the 18th, and found it to be in flood and not fordable. I had left the folding canvas boat with which I had been supplied behind at Lac Ste. Anne, but fortunately Mr. A. H. Hawkins, D.L.S., who was on his way out to continue the extension of the thirteenth base line, was camped on the other side of the river and he very kindly placed his boat at our disposal. We were thus enabled to get part of our outfit and supplies across the river that evening and succeeded in getting the balance over by nine o'clock next morning. Having the horses all loaded shortly before noon, we again proceeded west and arrived at the ford on Lobstick river that evening during a heavy rain.

The Yellowhead Pass trail is open as a wagon road from Lac Ste. Anne to a point about two miles beyond the crossing of Lobstick river, near the west side of range 8, and the land traversed by this portion of the trail is mainly high and rolling.

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covered with poplar woods and intermingling stretches of partially open prairie, on which there is a good growth of grass and some scrub. On these open stretches are to be seen the houses and outbuildings of new settlers, and apparently this country will become the home of a thriving and prosperous community at an early date.

On June 20, after the packs were loaded on the horses, we forded the Lobstick, and proceeding westerly about two miles came to the point where the wagon road dwindles down to a mere pack trail or bridle path, winding through the woods, and marked by an occasional blazed tree. About six miles farther on the trail crosses tamarack swamps and stretches of it are very soft and sloppy. A rainstorm began at 4 p.m. and at 5.30 we camped on an open piece of high ground after crossing a swamp, in which there was good pasture for the horses. The next day we remained in camp owing to the heavy steady rain which continued till evening. The following day proved to be very fine and we continued our journey westerly; the trail passes through the southern part of township 53, range 10, west of the fifth meridian, and was in very good condition in spite of the recent rainy weather; the country traversed was wooded with poplar or mixed poplar and spruce. Several small creeks were crossed where care had to be taken in order to prevent the pack horses from getting mired.

In range 11 the trail was in good condition except about two miles near the west side of the range. In range 12, which we crossed on June 25, the trail winds through woods of spruce and poplar mixed with jackpine and brulé, and about thirty per cent of it is through soft, boggy, swampy lands. In this range also several creeks were crossed, some of which were quite miry.

On June 26 I commenced work by retracing the north boundary of section 31, township 52, range 12, and began the extension of the fourteenth base line across range 13, by turning off the line from the north boundary of section 31. It was cloudy in the evening and I was unable to take an observation for azimuth, and next day continued the production of the line, till a heavy rain set in early in the afternoon. During June 28, 29 and 30 this rain continued with but little interruption and caused abnormally high water in the creeks and streams.

On July 1 we were able to proceed with the production of the base line along the north boundary of township 52, range 13, and on the evening of July 2 I obtained my first observation on Polaris. Next day we corrected the portion of the line previously run and continued it on its true bearing.

Yellowhead Pass trail runs through range 13, about three-quarters of a mile north of the fourteenth base line and we were able to camp along this trail and avoid the necessity of cutting a trail for our own use. Although the country about half a mile north of our own line was fairly light brulé, the line had to be opened through comparatively heavy woods and consequently our progress was rather slow, but we reached Carrot creek near the west side of range 13 on July 9, the camp having been moved along the trail to this creek the previous day. On the evening of the 9th a pack train came in with a load of the supplies we had left behind at Lac Ste. Anne, and also brought up our folding canvas boat, which the packer in charge of the train found to be of the greatest value in crossing Pembina river and some of the larger creeks which were very much swollen by the recent heavy rains and were not fordable.

On July 12 one of my men, while carrying an axe, spade and mattock, slipped off a log and fell on the point of the mattock, which penetrated his back above the hip and rendered him unable to resume work on the line for about six weeks. Being thus short-handed, and the line continuing in heavy timber, I was unable to attend to the work of exploring the country, as required by my instructions.

In ranges 13 and 14 and the east half of range 15, a distance of fifteen miles, we did not run across a swamp of any size, and the first one met with was on July 24, when the line entered a tamarack swamp, occupying the southwest part of section 4 and the southeast part of section 5, township 53, range 15. On the following day

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the line crossed the Yellowhead Pass trail, and for the first time entered comparatively open *brulé*. Intermingled with the *brulé* were areas of low wooded land with medium sized spruce, together with many spruce and tamarack swamps.

We reached Wolfe creek with our line and moved camp there, on July 25, finding in the valley of that creek, along the trail a fine open hay meadow dotted in places with patches of scrub and groves of poplar. The pasture found in the valley of Wolfe creek, was superior to any we had yet come across, since leaving Lac Ste. Anne, although we had found fairly good feed for the horses at all our camping grounds along the trail. In the comparatively open *brulé* we found a crop of fine large strawberries.

On August 2 we reached Moose creek, in the eastern part of range 17, with our line, the camp having been moved there on July 30. By the end of July we had completed in all twenty-two miles of the base line, the greater part of which was opened through heavy timber.

During the months of June and July, a great amount of rain had fallen and the trail was almost in an impassable condition, however it was not till the latter part of July that our supplies needed replenishing, when we had no difficulties in bringing in all we required, from our depot at Big Eddy, which proved to be very centrally located.

Between Wolfe creek and Moose creek our line ran through a great many swamps, but the trail kept mainly along the ridges or higher lands, though in passing from one ridge to another, many low swampy and boggy places were crossed by it. The worst of these boggy places on the trail have been corduroyed but the greater portion of the corduroy is now in a bad state of repair.

Our first crossing of McLeod river with the line was made at the northeast corner of section 34, township 52, range 17, west of the fifth meridian on August 3, and camp was moved over on the 5th when the horses loaded with their usual packs were able to ford the river in safety. We reached the second crossing of McLeod river with the line in section 35, township 52, range 18 on August 8, and that day our camp was moved to Big Eddy, where our supplies had been stored the previous winter with Mr. B. Berthoux, the general merchant there. A short distance east of Big Eddy Mr. A. Sinclair, a squatter, had erected a good loghouse and barn in the flats on the north side of McLeod river, and had also a very fine garden.

We continued our line and on August 13 moved camp from Big Eddy about three miles up Sundance creek, still using the Yellowhead Pass trail. On the 15th camp was moved to the crossing at Sundance creek, where there was good pasture for the horses and on the following day we continued our line and also moved camp to Whitemud, where there is a good open hay meadow and a fine stream of pure water.

During the night of August 16 there was a heavy downpour of rain and the following day we were detained in camp by a steady fall of wet snow, sometimes turning to rain, which continued till about ten o'clock in the forenoon of the 18th; however, the snow melted as it fell and after the storm was over the weather turned fine and bright. Previous to this storm the rainfall had been rather excessive but now the weather turned drier.

At Whitemud we were again in the valley of McLeod river, but from this place to Big Eddy the river makes a big loop to the south, away from the base line, while west of Whitemud to The Leavings, a distance of ten or twelve miles, the river runs nearly parallel with and only a short distance south of the base line.

We moved camp to The Leavings on August 30 and on the following day completed the survey of the base line to the west side of range 21, a distance of fifty-four miles in all, our record for August being 32 miles.

At The Leavings there is a fine open hay meadow about forty chains long and thirty chains wide, where we found excellent feed for our horses. At this place the Yellowhead Pass trail leaves the valley of McLeod river and continues westerly to Athabaska river, approaching it at Sandstone creek, while another loop of this trail

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turns northwesterly from The Leavings and crosses to the north side of the base line about the centre of range 22 and after continuing northwesterly for some distance turns southwesterly and crosses the base line about the centre of the north boundary of section 34, township 52, range 23, and in our survey of the base line from the east boundary of range 13 we were able to use the old trail and camp alongside of it without the necessity of making any new trails till we crossed it for the last time near the centre of range 23.

On September 2, we moved camp from The Leavings by the northerly loop of the trail to a point on the high ridge or divide between McLeod and Athabaska rivers, which was about half a mile south of the base line. On this divide, feed for the horses is so scarce, that they had to be taken back and pastured at The Leavings.

About 10 o'clock on the night of September 9 a heavy snow storm set in, and continued till the morning of the 11th, when the ground was covered with snow to a depth of five inches. The weather continued cold during the 11th and the snow did not begin to thaw until the afternoon of the 12th. During the 13th there was a drizzling rain the greater part of the day, and on the 14th, 15th and forenoon of the 16th there was a continuous storm of wet snow. After this storm the weather turned milder and in two or three days the snow was all gone and the temperature ranged about sixty degrees Fahrenheit through the day until the middle of October, during which time no rain fell except for one-half day.

We left Yellowhead Pass trail, after crossing it for the last time with the base line about a mile and a quarter east of Athabaska river, and from this point it was necessary for us to make a new trail for our own use, while we continued westerly in the vicinity of the base line until we struck the Smoky river trail in the westerly part of range 26.

On September 23 we moved camp across Athabaska river. Here our folding canvas boat proved to be most useful, as by its aid, we were able to move our outfit and the supplies we had on hand across the river, in a very short time. Before swimming the horses across, I had the packer bring up the balance of the supplies from our depot at Big Eddy, except a small quantity left for our return journey. For the safe keeping of our supplies and outfit, that were not required for immediate use, I had a log hut or storehouse built on the westerly side of the river, and in order to take care of some additional supplies which would be required during the latter part of the season, together with oats for the horses, I had also a small log house or shack built on the easterly side of the river, so that the goods could be placed in this storehouse and left in safety, at any time, by anyone bringing them up. I had previously ordered the supplies likely to be required and oats for the horses, and had given instructions that they should be forwarded from Lac Ste. Anne, as early as possible. Owing to unusual frosts, the oat crop was a partial failure and slow to ripen, thus delaying the threshing season, and it was therefore very late in the fall before a supply of oats could be secured and forwarded. Owing to the late date at which oats could be obtained and shipped, the charges for freighting them up by pack-train, were much higher than they would have been earlier in the season. To avoid the extra charge for packing, I asked that old oats be obtained and forwarded but it was found impossible to secure old oats as they were being saved for seed, because the germinating power of last season's crop had been injured by frost.

In continuing our line westerly from Athabaska river it was necessary to take with us supplies for about ten days or two weeks only, as the packer could readily make a trip back to our storehouse on the westerly side of the river when further supplies were required, and while there he could, with the aid of our canvas boat, easily cross the river to look after any supplies or mail that might have been brought up and left at the cache on the easterly side.

On the westerly side of the river, in the vicinity of the base line, there was, fortunately, a large area on which we found fine feed for the horses. We still had the

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original number of horses with which we had set out from Edmonton, nearly all of them being in very fine condition.

On the high ridge or divide between McLeod and Athabaska rivers our line had to be opened out through several miles of heavy spruce and jackpine woods, and also through *brulé* with dry standing spruce and jackpine trees from six to twenty-two inches in diameter. Through this our progress was rather slow, but after crossing the Athabaska the land was more open, mainly light *brulé* with second growth poplar and small scattered areas of spruce, through which the line was opened out quite rapidly. After getting over about seven miles of this comparatively open country, we again ran into a stretch of very heavy woodland on the high plateau in range 25, and the western part of range 24, making our progress again rather slow.

On November 11 we completed all work to be done as far as the easterly side of Whitefish lake, which is crossed by the base line in the westerly part of range 26. On the following day we moved camp to the west side of the lake.

The easterly bank of the valley of Whitefish lake rises to the height of about a thousand feet above it, and along this bank is a cliff formed by an outcrop of sandstone, about one hundred and twenty-five feet high. It was necessary for us to make a detour around the south end of this lake in order to reach the Smoky river trail, which runs northwesterly from Prairie creek to Smoky river and passes along the southerly end of the westerly side of Whitefish lake. We struck this trail where it crosses the creek running northerly into the southerly end of this lake, being at a point about two miles south of the lake. We were then able to proceed northerly by the Smoky river trail to the point where it turned northwesterly away from the lake and thence northerly by an old trail running near the westerly side of the lake, to a point a short distance north of the base line, where we found a good camping ground by the lake and close to a good hay meadow in which there was splendid feed for the horses.

When I got around to the west side of the lake, I had the pleasure of meeting Mr. A. Saint Cyr, D.L.S., who was engaged on the survey of the sixth meridian as far south as the fourteenth base. It was his intention to run south from this base line along the east boundary of range 27 instead of producing the sixth meridian farther.

On November 13, we continued our line west from Whitefish lake. The distance across this lake not having been previously measured, the chainmen were now able to measure it on the ice, the lake being covered (except the deep central portion of it south of the line) by a sheet of perfectly smooth and clear ice, somewhat over an inch in thickness. Great numbers of whitefish, jackfish, etc., could be seen swimming around in the water beneath the ice.

West of the lake the country was comparatively open for the distance of about a mile; then our line entered a thick wood of small sized spruce, through which it passed for the further distance of about a mile, and entered a *brulé*, which with a few scattered areas of spruce and jackpine, extended to the sixth meridian. About two miles east of the sixth meridian we crossed Hay river, a beautiful stream of pure water, about fifty or sixty feet wide and from two to five feet deep, running northeasterly, in a wide and deep valley, in which there are some good hay flats with excellent pasture.

From the westerly side of Whitefish lake we moved camp on November 18, to Hay river, going round by Smoky river trail. At this time the ground was free from snow, none having fallen since September 16, but the morning after camp was moved to Hay river, about three and a half inches of snow fell between 7 and 9 o'clock, and in the forenoon of November 22 there was a further fall of snow.

In McLeod and Athabaska rivers there are great numbers of jackfish, graylings, whitefish and a large species of trout. In Hay river, in range 27, there are great

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quantities of bull trout and Carrot creek in range 13 is teeming with speckled trout. Whitefish lake in range 26 abounds with whitefish, jackfish, trout, &c.

In Whitefish lake there are also several families of beaver as can be readily seen by the large amount of poplar freshly cut by them.

Considerable numbers of bear, moose, and black-tailed deer are to be found in the above-named townships, and there are also a few wolves, foxes, mink, weasel, &c.

Ruffed grouse, or partridge are quite plentiful and a few prairie chicken were occasionally seen.

The climate is very similar to that of Edmonton. The rainfall is abundant, and grain growing and gardening can apparently be carried on without injury from summer frosts. High or cold winds rarely prevail, and last season, when the wind attained any considerable velocity it appeared to be a warm chinook.

We completed the survey of the base line to the sixth meridian on November 26, and as it was so late in the season I decided to return home instead of going north to begin the work of extending the fifteenth base line, west from its present terminus in range 20, west of the fifth meridian.

I began my return journey on the morning of November 27, and proceeding by the Smoky river trail I arrived with my party and outfit on the northwesterly side of Athabaska river, opposite Prairie creek, in the evening of the following day, and next day by the aid of a raft left there for my use by Mr. A. Saint Cyr, D.L.S., I crossed my outfit and supplies to the southeasterly side of the river. The river had begun to freeze over, the ice extending out from the sides with an open channel in the centre and a good deal of drift ice running, so that I was unable to get my horses across, either on November 29 or 30. However, on the evening of the 30th the weather turned milder and a considerable amount of rain fell during the night. Next morning I found the ice had loosened from the sides of the river and floated down, while about a mile above Prairie creek there was an ice bridge which held back the drift ice from beyond. Taking advantage of this opportunity, I swam my horses across the river, at Prairie creek in safety on December 1 and the following day with my party took the Yellowhead Pass trail for Lac Ste. Anne.

When at Prairie creek I engaged Isidore Findlay to assist me with twelve pack horses, while returning to Lac Ste. Anne, in order that I might be able to get over the trail more rapidly than I otherwise could and thus avoid the necessity of making double trips. He was to join me at my cache on the Athabaska river at the fourteenth base line when I stopped to secure supplies, oats for the horses, &c., stored there for my return journey. I secured these supplies on December 4, but Mr. Findlay did not overtake me till some days after, and we arrived at Lac Ste. Anne on the evening of December 20.

I started out from Edmonton on June 10 with twenty pack horses, and fortunately, after a season's hard and faithful service, I was able to take them back to Lac Ste. Anne fit for work, strong, and in good condition, and in justice to my packer, Mr. Thomas J. Thompson, I must add that he deserves a large amount of credit for his faithful services and untiring exertions in always looking after the horses, day or night, in seeing that they got the best possible pasture and did not stray away. By his care in loading and packing the animals, they were kept free from the usual trouble of sore backs, and he was able to look after them, and have them on hand when required, without using hobbles, or tethering ropes.

On December 21, I completed arrangements with Mr. Gunn, chief officer of the Hudson's Bay company at Lac Ste. Anne, to store the outfit and winter the horses belonging to my party and in company with Mr. A. Saint Cyr, D.L.S., who was also returning with his party, engaged teams to take both parties to Edmonton, where we arrived on the evening of December 23.

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At Edmonton I paid off the men belonging to my party and after closing up all business requiring my attention there, I returned home to Welland, Ont., arriving there on December 31, 1907.

I have the honour to be, sir,

Your obedient servant,

GEO. ROSS, *D.L.S.*

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APPENDIX No. 33.

REPORT OF JOS. E. ROSS, D.L.S.

SURVEYS IN THE RAILWAY BELT, KAMLOOPS DISTRICT, BRITISH COLUMBIA.

KAMLOOPS, B.C., February 24, 1908.

E. DEVILLE, LL.D.,
Surveyor General,
Ottawa.

Sir,—In accordance with instructions I beg to submit the following report on my survey operations in the railway belt in British Columbia during the season of 1907:—

Having instructions to make a traverse of Columbia river from a point on the Canadian Pacific railway to the north limit of the railway belt at the most suitable time during the winter, I proceeded to this work on January 17 before completing my returns of the previous season. On arriving at Beavermouth, the starting point, I found that, although there had been extremely cold weather, the river was partly open and the ice weak in places, and that there was considerable slush. The conditions indeed were not nearly so favourable as I had anticipated. There were frequent heavy snowfalls and this, together with the slush, not only made travelling difficult but also prevented us from moving our outfit on sleds or toboggans. We were compelled to resort to the primitive way of packing on our backs. In consequence some of the party quit in disgust. However, I secured more men without much trouble and continued the work. For several weeks our progress was slow, but on February 6 a slight thaw set in, the snow settled, and, on again freezing, a crust formed which made travelling good and allowed us to walk on the weakest ice. From this until March 10, when I finished the work, the conditions could not have been more favourable. Although the main object was to define the limit of the belt line I also planted witness corners at the intersections of all the east and west section lines with the river, which corners, in case of future surveys anywhere along the river, can be used as starting points.

While the Columbia is winding and in places loops and islands have been formed as well as numerous back channels, the general direction is nearly northwest. At the railway the river averages five chains in width, but it gradually widens until at the head of Surprise rapids, near the boundary, it is about a quarter of a mile wide. The channel is navigable, having a depth of from six to ten feet. As the river forms the boundary between the Rockies and the Selkirks it is needless to say that the country is generally mountainous. There are several large flats along the river, one below the mouth of Beaver river and the others at the mouths of Gold and Bush creeks, which flow into the Columbia from opposite sides. So far as seen the middle of the flats is marshy. The timber is mostly spruce of from ten to twenty inches in diameter. On the high land the timber is fir. From the indications I would say that a considerable part of the low land is flooded in the spring and during high water in the river. There is suitable land here for a few settlers, but I do not think there is any prospect of agricultural development until conditions become more favourable in regard to transportation facilities. Possibly as timbering operations proceed and in consequence roads are made and the timber partially cleared off all the available land will be taken up.

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On returning to Kamloops I finished all my returns of surveys to date, and on May 10 I commenced the general work of the season. In Salmon river and Spillimacheen valleys, which are the most important centres of the district, small surveys had been accumulating for the last four years so I decided to confine my operations to these parts until the work was entirely completed. This occupied the greater part of the season. The greater portion of the farming land has been surveyed and taken up, but extensions are continually being made on the hills and outlying parts. In Salmon river valley the surveys were small and scattered and were at elevations of from a few hundred to four thousand feet. While the soil is fairly good the declivities and broken surface of the country render much of it unfit for anything in the nature of farming except stock raising. The first land of any extent suitable for settlement I found in township 17, range 10, west of the sixth meridian, situated on a low mountain about five miles long by three miles in width and at an elevation of from five hundred to fifteen hundred feet above the surrounding valley. A part of the westerly side has been taken up by an Indian reserve and provincial lots. The top is thickly wooded with a rolling surface but the sides are mostly open with a steep slope. There is considerable arable land with fairly good soil, but the water is alkaline and scarce. There is a wagon road built by one of the settlers to the main road from the town of Armstrong, situated about four miles to the east on the Shuswap and Okanagan railway.

In township 18, range 9, at an elevation of three hundred to four hundred feet above the main valley there is some land suitable for settlement. It has good water and the timber has been mostly all burnt off. There is at present a thick growth of brush. A good road leads to the town of Enderby three miles distant. Both this township and the one previously mentioned had been partly surveyed and I completed the surveys. There are also a few sections of fairly good land in township 19 of this range. Here the surface is rolling, the soil rather light but the water is good. This land lies about midway between Salmon Arm and Enderby. The main road connecting these places runs through the middle of the survey. I completed the survey of the easterly half of this township.

I next made some surveys along Shuswap river, consisting mainly of river traverse. The sections had been mostly run out on a former survey to establish the belt boundary at Mabel lake. Some four or five squatters have gone in here recently. Besides completing the surveys needed for them I surveyed all the land that would likely be taken up. The only land that appears suitable for settlement is in the quarter sections along the river, as farther back the land is hilly and heavily timbered. There is not sufficient timber on the lands squatted on to warrant it being included in a timber berth. The greatest drawback to settlement has been the want of a good road. We had to cut our way around the worst places. The lumber companies operating on Mabel lake had been hauling in supplies for several months and in consequence the road had been cut up in the worst possible way. The provincial Government has expended about \$5,000.00 a year on this road for the last two years. Another season's work at the same rate should put it in good condition.

The rest of the surveys were small and scattered. At 'Grande prairie' I spent several weeks making retracements and connections with provincial lots. As I was on the point of closing for the season I received instructions from you to make a number of connections between my last year's surveys and those of 1886 and 1887. I was engaged on a partial survey of these until the end of the year when I closed field operations.

As to minerals I may say that the country covered by me has been well prospected as is shown by the numerous location posts and prospect holes found nearly everywhere. So far the prospects are not very promising. The only mineral in quantity noticed was a deposit of gypsum in township 18, range 12, west of the sixth meridian.

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Surveying the railway belt differs in some respects from the ordinary sub-division work. The country is more mountainous and broken. This is especially the case where the limit of the belt has to be defined. The sectional work is gradually becoming rougher since the main body of the agricultural lands is already surveyed. The lines have to be carried over ridges to the smaller valleys. The surveyor now is usually obliged to begin where the first surveyor considered it advisable to leave off. The starting point is often in some out of the way place at which it is inconvenient to take observations for azimuth or perhaps it is a witness corner put in at the foot of a steep rocky bluff. The extent of country covered is great, usually extending from one hundred to two hundred miles along the railway and involving work in as many as thirty townships. Much time is also taken up in making connections with Indian reserves and provincial lots as well as retracements and closing of Dominion section lines. While making these connections especially when in open country, the chief is by far the hardest worked man on the party.

If complete surveys of the best agricultural townships had been made at the outset it would have proved much more economical and satisfactory but this of course could not be foreseen. This plan could not now be adopted without putting on a large force of surveyors otherwise the work would fall behind and urgent cases could not receive attention. Your present plan of having a township, or part of one, completed when it does not entail much extra labour is a move in the right direction and possibly the best that can be done under the circumstances.

It will be seen from what has already been stated that the railway belt cannot accomodate any large influx of immigrants. The land seeker here, at present, needs to be to some extent a prospector also. If the land lies on a bench he must use his judgment and experience as to what crops can be grown successfully without irrigating; possibly he may have to locate a road, and this also requires experience as quite often a roundabout way has to be taken to obtain a suitable grade; sometimes a switchback or loop has to be put in the road. If the land needs to be irrigated it will be necessary to investigate as to whether water can be obtained from a stream by damming or putting in a reservoir.

As the bulk of the farming lands in this district have been surveyed for some years it was generally expected that the survey list would soon reach the vanishing point. This however does not appear to be the case. On the contrary the list of surveys needed is yearly growing larger. Lands that were once considered unfit for farming are now eagerly sought after and people are gradually settling in the more remote isolated parts. Much depends on irrigation. The provincial government have had this matter under consideration and it is expected that legislation will soon be passed which will have a beneficial effect on all future irrigation works. The climate is perhaps one of the greatest inducements to settlement in this district.

The setback in business which prevailed throughout the country during the latter part of the year was marked by the closing down of the lumber camps and a few of the mines, causing many labourers to be thrown out of work with a consequent fall in wages. It is expected that this will be only temporary and that the usual industrial activity will be resumed in the spring.

A descriptive account of the land in the townships surveyed is attached hereto. My assistant, Mr. Geo. H. McCallum gave complete satisfaction.

I have the honour to be, Sir,
Your obedient servant,

JOS. E. ROSS, D.L.S.

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APPENDIX No. 34.

REPORT OF A. SAINT-CYR, D.L.S.

SURVEY OF THE SIXTH MERIDIAN BETWEEN THE THIRTEENTH AND SIXTEENTH BASE LINES.

OTTAWA, February 17, 1908

E. DEVILLE, Esq. LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to transmit to you the general report on my surveys during the past season.

These consist of the survey of the sixth initial meridian in a continuous line from the sixteenth base line as far south as the northeast corner of township 52, and also in locating its position beyond the Bullrush mountains which rise over 8,000 feet above sea level.

This last work was accomplished by surveying from the fourteenth base line the east outlines of township 52 and 51, range 27, west of the fifth meridian. Then from the temporary post left at the southeast corner of township 51, a traverse survey of eighteen miles was made around the eastern slope of the above mentioned mountains in order to define the position of the sixth meridian. This having been determined by calculations, the south half of the east boundary of section 1, township 49, range 1, west of the sixth meridian was surveyed south to the northeast corner of township 48. Here I planted an iron post and built a mound. This monument falls near the foot of the mountains west of Athabaska river and the pack trail between Jasper House and Big Smoky river crosses the line on which it is erected. As this line was well opened and blazed it will be an easy matter at any time to find this monument should it be required for future surveys.

On receipt of your instructions I immediately set about completing the returns of my previous season's surveys in the Peace river country from which I had just returned, and when it was convenient I attended to the final arrangements of the coming survey such as making inquiries for a few more pack-animals to be delivered to me at Edmonton, ordering a new camp outfit and having more supplies forwarded to Sturgeon lake which was to be my base of supplies for the first part of my work. I had previously been informed in Edmonton that some packers going to 'big eddy' on McLeod river had just returned to Lake St. Anne without reaching their destination, owing to the deep snow and scanty feed along the trail usually followed by the pack-trains, and that no one would undertake to freight in that direction till conditions should have improved. As a matter of fact part of my supplies which had been brought as far west as Lake Ste. Ann in February, were not delivered at 'Jocks house,' on Prairie creek, till the end of August. But in that district the conditions were such during the early summer that I presume such delays in transportation could not have been entirely avoided. On the strength of the information received in Edmonton, I decided to reach the country where my surveys were by way of Lesser Slave lake and East Prairie river settlement, where my pack outfit was stored and where the ponies which I was to use again on my present work had wintered. On March 28, I left Ottawa for Edmonton where I arrived five days later. Some time was spent here in hiring men and in trying to enlist the services of freighters willing to transport my party and outfit to Lesser Slave lake. This proved to be a

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difficult task at the time because daily reports were being circulated in town by incoming freighters from the lake, that the ice had already broken over the rapids of Athabaska river. Finally through the untiring efforts of Messrs. Revillon Bros., Mr. Rami Baert and his brother consented to undertake the journey and finally signed the contract, having beforehand provided against loss by possible accident by insuring their horses for the trip.

On April 7 my party and the freighters left for the north with three heavily loaded sleds. In the meantime the ponies ordered had arrived. The pack-saddles etc., needed for these horses were soon ready, and on April 10 I started on my journey overtaking my party at Short's stopping place.

Near St. Emile, where there is a homestead, the freighters found it impossible to travel any farther with sleds and had therefore transferred the loads to wagons, continuing their journey with an extra team of horses and an extra wagon loaded with three sets of sleds which would have to be used again between Athabaska Landing and Stony point, at the head of Lesser Slave lake.

On April 12 we arrived at the Landing. The state of the ice on the Athabaska was far from inviting; so every precaution that experience could suggest was taken and two days later we reached without any serious mishap 'Dumont's place,' at the mouth of Lesser Slave river. Here were camped a party of colonists who were prevented for the present from proceeding any farther, on account of the unsafe condition of the ice on the river. They advised us not to attempt to travel any farther on the ice, greatly weakened by recent rains, so we took again the overland route cut by Mr. Selby's party and mine three years ago. As this road passes through the woods there was still at the time enough snow left on the ground to permit the use of the sleds.

On April 17 we camped at the foot of Lesser Slave lake. One of my freighters who had not been well for some time became very sick, and wished to return home. However, I persuaded his brother that it would be preferable for all concerned to use all possible diligence to reach the end of the lake where the invalid would have the services of Dr. West of the Royal Northwest Mounted Police and those of the Roman Catholic mission. So we left the next morning and three days later camped at Stony point, Mr. Baert, being removed to the hospital where for several weeks he was very ill with typhoid fever.

At Stony point I found the narrows between Buffalo lake and Lesser Slave lake only partly free of ice and though the water is shallow at this point still the bottom of the lake is such as to make it dangerous if not impossible to cross with heavily loaded wagons. So I decided to go by way of the English mission, a rather long detour, but the only practicable road then.

We left Stony point on April 26, and reached 'Jobin's place' the same night. The next day we had to ford South Heart river which took considerable time as the water was very high. The scow which in previous years had done service as a ferry had been carried away by ice a short time before, so that in order to prevent our baggage or supplies from getting wet or spoiled they had to be placed on the top of the wagon boxes out of the reach of the water. This necessitated many trips across this stream.

The next day we reached Frank Mirault's ranch. Here I was able to hire two more freighters with their teams to carry to Sturgeon lake my supplies, outfit and also grain for my pack ponies.

The difficulties incidental to the trip between Edmonton and the head of Lesser Slave lake recur every spring. To travel this distance with any degree of certainty one must always provide two modes of transportation, i.e. he must have in his train both sleds and wagons to be interchanged as occasion requires it. These drawbacks may partly disappear in the future as the country becomes better settled, when casual help may possibly be obtained from the people living on the road. I have noticed

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already quite an improvement in some matters along this route, stopping places, such as they are, have been built and more are being erected at convenient intermediate points along the rivers, while in my previous travels over this northern country the top of the loads afforded us the only resting place for the night.

Another source of inconvenience was that three years ago no horse-feed of any description could be had along this route; consequently extra teams had to haul sufficient bales of hay to last also for the return trip, a total distance of 300 miles. Now, hay can be procured at nearly all the stopping places.

In regard to oats, it is still cheaper to carry a supply. If this is not done one may be compelled to buy them at Lesser Slave lake where they cost one dollar per bushel. I have myself often had to give one dollar and fifty cents per bushel for oats and even pay this exorbitant price for large quantities.

The treacherous condition of the ice on Lesser Slave river is a constant and unavoidable source of danger. Besides twenty miles of bad rapids there are spots, such as, at the confluence of Sauteux river and Slave river, where the ice even during the coldest weather is honeycombed by air holes. Every winter valuable teams of horses are drowned and whole loads of supplies which cannot be duplicated are lost to the traders. Such mishaps occur too often and could only be prevented by the opening of an overland route between Athabaska landing and the head of Lesser Slave lake, one hundred and fifty miles apart.

On April 30, Mr. O. D. Hill delivered to me the government horses (16) and the pack outfit which I had left in his care two months before and I started for Sturgeon lake trading post on the winter road which passes by Snipe lake. On May 3 we came to Little Smoky river which had to be crossed on rafts; we continued our journey towards Sturgeon lake where we arrived on May 8. Here the freighters were paid off and preparations begun for our next trip to the starting point of my surveys.

At Sturgeon lake trading post I was surprised to see the lake still frozen over and no signs of spring yet perceptible. None of the bustle always attending at this season the exchange of furs for the commodities required by the native trappers could be noticed at the fort, and I was told that owing to the severest winter ever experienced in this district the natives were unable to return for the trading season and the Hudson's Bay company people were preparing to send them relief. The fall of snow had been so great that all their ponies perished, the little feed which they obtained during the winter months by pawing through the snow down to the grass being insufficient to keep them alive.

One Indian, who had worked for me when I was surveying in that district during the winter 1904-5, had just returned to the post from his winter hunt by following the trail which I intended to take in going to my work. He informed me that Simonette river and Moose river had overflowed their banks and that in the forest the snow was still in many places several feet deep and that feed along the trail was scanty and poor as no new grass had yet started to grow. So I decided to hold my band of horses a little longer at the lake wishing for heavy rains, the only thing that would draw the frost from the ground and start vegetation.

On May 13 we left the post and pitched our camp near a creek one mile and a half south of the eighteenth base line. The next day we started to move camp but we had not travelled very far in the forest before we got into the deep snow and had to return to our last camp. The packers with part of the horses were then sent back to Sturgeon lake with orders to bring camp supplies and some of the men's baggage which could not be carried on our previous trip. During the following days it rained continuously.

When the weather was settled again we resumed our journey and on May 21 camped on the right bank of Simonette river which two days later we had to cross on rafts loaded with our effects, whilst the horses swam across.

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At this point there is a ford which I had often used in previous years but which could not be utilized now that the river swollen by the recent heavy rains and the melting snow in the hills had become a raging torrent which would have swept our loaded ponies off their feet.

Beyond the Simonette our progress was often checked by bad roads blocked by fallen timber and in the many days which elapsed before we came to the last crossing of the river at the north boundary of township 61, delays were constantly occurring at the crossings of overflowing creeks which had to be bridged over, and at the passages of extensive swamps which had to be corduroyed. Add to this frequent rains followed by snowstorms and a pretty good idea can be formed of the unfavourable conditions under which we had to travel. The whole country is very hilly and in many places the land is also covered with dead trees lying in every direction and piled up several feet high. There are also large tracts covered with thick willow or scrubby young pine.

On June 13 we arrived at the last crossing of Simonette river, which was forded without difficulty though the current is very swift at this spot, and we camped on a low point at the confluence of the river with one of its southern tributaries.

On June 27 I reached the northeast corner of township 60, range 1, west of the sixth meridian which was the initial point of my surveys. The position of the monument to mark that corner having been established according to your instructions, I proceeded south with my surveys.

GENERAL DESCRIPTION OF THE COUNTRY ADJOINING THE SIXTH MERIDIAN, FROM THE NORTHEAST CORNER OF TOWNSHIP 60, TO THE NORTHEAST CORNER OF TOWNSHIP 52.

Beginning at the northeast corner of township 60, the sixth meridian runs south one mile through spruce and pine woods. In section 25 it enters an extensive tract of brulé, at the present time thickly covered with deadfall. This land is poor and deeply cut up by the valleys of tributaries to Simonette river. By a gradual ascent the line rises in section 13 to 4,450 feet where it crosses the watershed between Simonette river to the north, and Little Smoky river to the south. The divide here consists of several ranges of hills and nearly parallel to the north boundary of township 59. The ramifications of the outer ranges extend far into the township south of this line and in the intervening depressions are many spruce swamps, muskegs and lakes. One of these lakes, over one mile long and one-third mile wide crosses the line at the northeast corner of section 1. Those found on the northern slope of these hills drain towards the Simonette, whilst the streams which rise on the opposite slope empty into Little Smoky river which flows from west to east through the middle of township 59.

These hills whose tops and northern slopes are timbered mostly with jackpine extend far to the west where they appear to connect with the foothills of the Rocky mountains.

From the divide, (altitude 4,450 feet) one gets a comprehensive view of the general direction of the valley of Little Smoky river and of the intricate windings of this stream so that the course of the river can be traced to the foothills. There it bifurcates and seems to emerge from two principal gaps, the widest one coming from a southwesterly direction.

A southern tributary joins also the Little Smoky at half a mile west of the corner of section 13, where the river leaves township 59.

At its crossings (altitude 3,925 feet) on the line, the river is a chain and a half wide and flows at the rate of three or four miles an hour over a stony bottom. At the time of survey (July) this stream was easily forded with horses.

The valley of the Little Smoky is three and one-half miles wide between the edges of the hills which bound it on its north and south sides and is 350 feet deep. Except the narrow belt of merchantable timber above mentioned as contiguous to the

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river, the forest which years ago covered the bottom land in this valley and the slopes of the hills on either sides has been overrun by fires and the road which followed at some distance the left bank of the Little Smoky is so obstructed by fallen timber as to be impracticable for travel. Some Indians from Sturgeon lake informed me that this road led to the headwaters of the Little Smoky and that from that point one could cross the divide and reach Big Smoky river in half a day.

A lake surrounded by hay meadows which cover part of sections 26 and 27 drains into Little Smoky river. It lies in a secondary valley parallel to that of the river from which it is separated by low gravel ridges. Between the river and the hills which rise south of it some prairie land with good soil was noticed along the right bank of the river through township 51, range 1.

With this exception the rest of this township is hilly and the soil in the northern half is a clay mixed with gravel and stones; in the southern half, the surface soil is clay mixed with sand and it overlies a subsoil of gravel.

Little Smoky river does not take its rise in the Rocky mountains but judging from the dark brownish color of its water it must head from swamps and lakes in the hills at the divide of Big Smoky river.

Continuing southwards along the east boundary of township 58 we passed through a rolling country where the soil is sand mixed with clay and which supports a second growth of small poplar and jackpine. Gravel ridges separated by large spruce swamps recur constantly.

In the middle of section 13 the line crosses a large creek, the last of several unimportant ones all flowing northeasterly towards Little Smoky river. Along each side of this creek runs an Indian pack trail. Half a mile farther, after crossing a low divide we came to a northern branch of Baptiste river which flows in the next important valley intersected by the sixth meridian.

The aspect of the country remains unchanged in township 57, whose principal feature is Baptiste river, a swift flowing stream which must take its rise in glaciers in the Rocky mountains. Its origin is easily inferred from the greenish appearance of the water so different in colour from that of all the streams met so far.

At the northeast corner of section 12, where it intersects the line, Baptiste river is forty-five yards wide. At about one mile east of that point it receives from the north an important tributary, the same in fact which crosses the line at the northeast corner of section 1, township 58. Small patches of prairie land are found near their confluence. Where the sixth meridian intersects the river its banks are low and wooded. Along the left bank the wooded flat extends half a mile back to a sandstone bluff one hundred feet high. On this flat grow spruce trees six to eighteen inches in diameter. On the opposite side the sandstone ledges, though not more than sixty-five feet high, drop abruptly to the water's edge. Thus through this sandstone bed the river has cut a valley half a mile wide where rocky bluffs and wooded flats alternate along its course. Baptiste river is an important tributary of Athabaska river and has always been recognized by the natives as the territorial division between the northern tribes inhabiting the Sturgeon lake country and those living in the vicinity of Jasper House near the foot of the Rockies.

In the centre of section 36 runs a belt, one-half mile wide, of balsam fir and spruce six to thirty inches in diameter and at different places in this township are patches of green timber of small size. The soil is sand mixed with clay; the subsoil, clay and gravel. South of Baptiste river the soil is a coarse yellow sand so thinly distributed on the top of the sandstone ledges that it made it difficult at certain corners to drive in the iron post to the proper depth. A creek flowing through some prairie land crosses this line a quarter of a mile north of the corner of township 56. It flows northeasterly towards Baptiste river.

From the northeast corner of section 36, township 56, the sixth meridian ascends gradually to the summit (4,400 feet) of wooded hills which cover the southern half of this township and cross the line at the north boundary of section 1. Here also stands

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another range resembling a terrace or table-land wooded with jackpine and for six miles, bearing a little east of north. This table-land bounds on the east the valley of a stream which rises in a large muskeg covering the north half of section 12. This creek flows between high cutbanks of sandstone and receives several tributaries which drain the swamp lands west of the line.

In sections 12, 13 and part of sections 14, 23 and 24, grow spruce and jackpine from four to eight inches in diameter. The other sections are covered with burnt timber and deadfall overgrown with a second growth of pine or scrub and willow. The land is also stony in many places. In the swamps, which are numerous, grow small spruce trees up to six inches in diameter. In the southern half of this township the soil is clay mixed with sand and a clay subsoil, which changes to gravel and stones in the other half. A quarter of mile west of the corner of section 36 there is some open prairie land.

In the northern part of township 56, there are many isolated groups of hills which are separated by marshes and have sandy and gravelly slopes supporting a light growth of scrubby poplar and jackpine. From the top (4,625 feet) of one of these hills six chains east of section 24 a good view of the Rocky mountains was obtained and measurements were taken on all the prominent peaks in order to determine their positions and altitudes. In the southern half, which is high rolling, meanders, a large creek which crosses the line in section 13. At one mile east of this point it receives from the north a tributary as large as itself. With a volume of water thus doubled the main stream now takes a northeasterly direction towards Baptiste river into which it empties. One mile north of the junction of these two creeks the width of the valley of the northern tributary is considerably reduced by escarpments of sandstone forty to fifty feet high, which reach down to the water's edge, thus causing a gorge. This spot would be an ideal one for developing water-power should the necessity arise in the future.

In the expansion of the valley above the gorge there is quite a stretch of prairie land and partly open country.

These remarks apply also to the valley of the main stream which flows along the north boundary of section 12.

The only live timber (spruce and pine, six to ten inches in diameter) to be found in this township grows in a narrow belt along the left bank of the last mentioned stream.

The soil is generally a sandy clay overlying a subsoil of clay.

Approaching the mountains the elevation of each successive ridge increases till in township 54 there is a prominent landmark called Jarvis ridge (altitude 5,050 feet). It is a remarkably straight but narrow terrace which extends across the centre of this township from east to west and continues on the same bearing far into range 2, where it terminates in an abrupt descent of several hundred feet to the general level of the country. This table-land is the watershed between the valley of Endurance creek (4,400 feet), which drains the southern half of this township and another large stream which flows along its northern boundary.

Sections 12, 13, 14, 15, 16, 17, 18 and 24, are wooded with spruce and pine, six to twelve inches in diameter. The other sections are covered with deadfall overgrown with willow or a second growth of jackpine. Large tracts of land in this township are swampy and marshy.

The soil, which is of clay mixed with sand, varies in depth from four to eight inches. The subsoil is generally clay.

The surface of this township is very hilly and it has a general downward slope towards the east.

The next stream of any size is a branch of Hay river. It runs diagonally across township 53, entering at its northwest corner and crossing its east boundary in section 1. From that point (altitude 4,600 feet) it flows eastward and three miles far-

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ther joins Hay river (altitude 4,050 feet) in section 51, township 53, range 27, west of the fifth meridian.

The foothills of the Rocky mountains, which in this vicinity trend northwesterly, cover one-half of this township. They rise to an altitude of 6,000 feet above sea and at their tops frequently appear escarpments of brown coloured sandstone. In the numerous narrow valleys which divide each range of hills are found strips of open and grassy land with good soil. These low lands, however, are liable to be flooded.

Along the hillsides the soil is generally gravel mixed with clay, and near the top the land is often very stony. Years ago a destructive fire overran this country, which is now covered with deadfall.

The pack trail from Jasper House to Big Smoky river intersects the east boundary of section 24. From that point it appears to follow the valley of the tributary to Hay river above mentioned. Owing to the proximity of the Bullrush mountains (altitude over 8,000 feet), which at that late season might have proved a formidable obstacle to the production of the line farther south, the survey of the sixth meridian was discontinued at the northeast corner of township 52. On November 14, I moved my camp to the northeast corner of township 52, range 27, west of the fifth meridian, and on the following days I surveyed south twelve miles more to the thirteenth correction line.

DESCRIPTION OF THE COUNTRY ADJOINING THE EAST BOUNDARY OF TOWNSHIPS 52 AND 51,
RANGES 26 AND 27, WEST OF THE FIFTH MERIDIAN.

Beginning at the fourteenth base line the east boundary of township 52, range 27, west of the fifth meridian, passes through three-quarters of a mile of rolling and wooded land, having a loamy soil resting on a clay subsoil. Beyond this the line enters a burnt forest and ascends gradually to the eastern slope of a range of hills which divide the basin of Hay river, west of the line, from a troughlike depression running parallel with the line at an average distance of one mile and a half east of it.

The surface of the southern part of this township is broken by hills rising to an altitude of 6,000 feet and whose tops and slopes are covered with burnt timber, most of which is still standing, whilst lower down where the ground is often marshy, some small areas support live spruce.

The central part is high rolling country merging into a series of benches of decreasing altitudes as one approaches Hay river, a mountain stream fifty yards wide and with a swift current flowing over a stony bottom. In the bottom lands, adjacent to the river the soil is good, on the benches, it is sandy clay overlying gravel.

The pack trail from Jasper House to Big Smoky river intersects the east boundary of this township in section 36. It then runs west two miles farther and after crossing a deep gulch with a creek which drains an extensive spruce swamp this trail continues northwesterly across the north boundary of section 34 towards the ford on Hay river about one mile farther on. At this point (altitude 4,050 feet) in the month of September the water was three feet deep in the channel. Some prairie land exists along the left bank of the river and this spot used to be a favourite camping ground for the Indian hunters as there is an abundance of good feed for their ponies. Above the ford the general course (south 20° west) of the river leads into the mountains, here the river flows between high cutbanks of gravel.

Below the ford, where the river turns to the northeast the banks are lower. Through repeated fires the spruce forest which once covered this valley has disappeared and to-day patches of cleared land are found in many places along this stream.

The general elevation of the valley of Hay river, near the ford is 4,050 feet. It enters the north boundary of this township in section 32, and from that point it continues for several miles in a southerly direction towards the Rocky mountains.

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A narrow, but deep valley, bounded to the east by hills rising 1,400 feet above its level, runs across the whole length of township 52, range 26, from section 32 to section 5.

In this depression are many lakes; the two largest ones, three miles and a half apart are named Jarvis lake (altitude 3,875 feet) and Gregg lake. The upper lake is the larger and is studded with islands, all wooded; the other one is very shallow; both are teeming with whitefish, pike and ling. These lakes are all connected and by the outlet of Gregg lake drain into Hay river, which flows into Baptiste river, itself an important western tributary to the Athabaska.

Jarvis lake covers nearly three-fourths of section 32, and Gregg lake the greatest part of section 5 and the half of section 8. In these lakes and all the streams which empty into them, the water is fresh.

What constitutes the only level land in this township would be included in section 17, the soil being wet and swampy, and sections 20 and 29, which contain some good prairie land, well drained. This strip of arable soil is bounded on the west by Gregg creek and on the east by a succession of hills culminating in a terrace or table land (1,400 feet above the valley).

The west slope of this high land drops abruptly to the eastern shore of Gregg lake, it has no vegetation thus exposing to view many ledges of sandstone. The southern slope, however, is densely wooded, not so abrupt and terminates at the edge of two other lakes (4,200 feet) draining towards the valley of Jarvis lake.

The pack trail between Jasper House and Big Smoky river passes from south to north through this township, which it enters in section 6. Here it follows the pine ridges along the west shore of Jarvis lake. In sections 17 and 29 it crosses Gregg creek. From the last crossing it goes to the west shore of the lower lake, where a branch of this trail follows close to its shore and eventually leads also to Hay river. The main trail, however, takes a westerly direction and intersects the east boundary of township 52, range 27, in section 36.

In section 17 another well travelled pack trail starts from the Jasper House and Big Smoky river main trail and passing at a short distance south of two small lakes enters a pass (4,350 feet) opening into the valley of Athabaska river, whence it leads in a southeast direction to a point on the river opposite the mouth of Prairie creek. At this point Athabaska river is not fordable, and the crossing is usually effected on rafts. Here also to the south very high perpendicular cliffs extend some distance along the west bank of the river. The opposite bank is low and close to it is an island wooded with spruce and cottonwood.

From the landing on the right bank of the river start two trails, one leading south follows the valley of the Athabaska, whilst the other one after winding up the steep side of high hills leads to Jock's ranch, three miles farther in the valley of Prairie creek. Jock's ranch is the first inhabited place we come to on the road to the Yellowhead pass, after leaving the 'big eddy' settlement, on Macleod river.

In sections 6, 12 and 13, of township 52, range 26, the timber is mostly jackpine from six to ten inches in diameter, spruce and poplar. The soil is a yellow clay mixed with gravel; in the hills the land is stony.

From the northeast corner of township 51, range 27, the line descends gradually to the level of the depression in which are Jarvis and Gregg lakes. In section 1, it passes over Solomon mountain (altitude 5,200 feet) a sandstone bluff with precipitous sides to the west, while north and east its foothills spread far into the interior of the next range.

The surface of this township is also very hilly and deeply furrowed by the valley of Solomon creek and the gulches of its tributaries.

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The soil is sandy, but the subsoil is gravel or stones mixed with clay; nearly all the timber has been destroyed by fire, a few scattered small patches of green bush appearing, however, here and there on the slopes of the highest hills.

The pack trail from Jasper House to 'Grande prairie' crosses the line in section 13. It winds through some open land, which slopes down to the southwest and extends to the valley of Solomon creek. Beyond this stream, a stretch of partly open country, one mile or so in width, continues for six miles farther south to the foot of the Bullrush mountains (altitude 8,000 feet).

Towards the east, this prairie land ends at a narrow strip of green timber growing along the west shore of Brulé lake, (altitude 3,200 feet) an enlargement of Athabaska river.

The depression which crosses from north to south in township 52 continues also on the same bearing and with the same features through township 51. The open land begins at the southern extremity of Jarvis lake (altitude 3,875 feet) in the middle of section 32. It forms a strip less than a mile wide and which extends through sections 29, 30, 19 and 18, where, owing to the vicinity of Solomon mountain (altitude 5,200 feet) it turns to the southwest. This prairie land has soil of sandy loam twelve inches deep overlying a subsoil of gravel mixed with clay. Where its edge merges into the foothills the surface is covered with much scrub poplar and willow brush while the top soil is also shallow.

In the middle of section 18 there is a hay meadow. The pack trail between Jasper House and Big Smoky river crosses the west boundary of this township in section 18, whence it turns north and winds two miles and a half across well drained and open land. In section 30 it enters the open pine woods along the west shore of Jarvis lake. Spruce and jackpine grow in sections 19, 30 and 31, but on the high hills which cover the rest of this township all the timber is burnt.

My next work was a traverse survey eighteen and one-quarter miles long. Its initial point was the temporary post planted at the southeast corner of township 51, range 27, west of the fifth meridian on the north side of the road allowance along the thirteenth correction line.

By that traverse the distance between this line and the mouth of Solomon creek is two and one-quarter miles. This creek is a western tributary of Athabaska river which it joins at the point where the river flows out of Brulé lake. Thence the survey continues for seven miles along the western shore of this lake which, at the time of survey (November 26) was nearly dry, the subsiding waters being confined to a single channel winding amongst the quicksands and banks of fine silt which form the bottom of the lake.

At the southern end of Brulé lake it was necessary to carry the survey over a high rocky ridge which projects eastward from the mountains and ends abruptly at the water's edge of Athabaska river. The pack trail ascends also nearly 1,000 feet along the mountain side. Beyond this ridge instead of following the river whose banks are heavily wooded, the survey was continued westwards along the foothills and in close proximity to the pack trail which passes through the more open sections of the country. In section 18, township 49, range 27, it descends to a large flat and after crossing Moose creek, which rises from a lake in the mountains, it leads through level prairie land which covers parts of sections 18 and 7. On leaving this prairie the survey passes over high and partly timbered hills overlooking Athabaska river whose left side it follows up to the east boundary line of section 1, township 49, range 1, west of the sixth meridian. This line was surveyed south from the quarter section post to the northeast corner of township 48, where the thirteenth base line should intersect the sixth meridian.

REMARKS ON THE COUNTRY ADJOINING ATHABASKA RIVER, ABOVE AND BELOW BRULÉ LAKE.

Brulé lake is a shallow expansion of Athabaska river. It is about one mile and a quarter wide and six miles and a half long, with its longer axis in the direction

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of the meridian. On its eastern shore are sandy dunes denuded of vegetation. Dunes were also noticed along the right bank of the river a few miles above the lake and especially near the mouth of Fiddle creek where standing live trees at the edge of the woods, which here extends to the water's edge, are buried to the depth of fifteen or twenty feet in this fine sand which is constantly being driven in that direction by the prevailing southern winds. These dunes also apparently supply part of the material which is gradually filling Brule lake.

Very different is the country along the west shore which is low and bordered with green timber next to which comes level prairie land gently rising towards the escarpment of Bullrysh mountains, forming an impassable barrier one mile west of the lake. The strip of prairie land is six miles long by one mile wide, is well watered by numerous small mountain streams and its altitude above the sea is practically the same as the place twenty-five miles farther south where Messrs. Swift and Moberly Bros. and others raise grain and root crops. This land should be just as fit for farming as any of the other places.

This prairie land is easily accessible from two directions. After the Athabaska has been crossed one road starting from Athabaska Landing opposite the mouth of Prairie creek, leads to it by following a southwesterly direction over the grassy benches along the left bank of the river. On this road at about three miles above the landing we passed some good prairie land and extensive hay meadows at the upper end of which Mr. Smith has built a house. One mile beyond Smith's ranch the trail crosses a large creek flowing in a very deep gulch with high precipitous banks and ascends to a plateau several hundred feet above the river level. A mile farther the trail bifurcates. The left branch keeps along the eastern edge of the plateau which overlooks Athabaska river and continues across prairie for three miles farther, when it enters open woods of pine and scattered spruce averaging eight inches. This forest extends easterly to the river which runs within half a mile of the edge of the plateau. South and west it extends to the valley of Solomon creek and the foothills of Solomon mountain. In crossing this forest the trail keeps at the same altitude descending at last to the level of Athabaska river, where it receives Solomon creek. After crossing the creek near its mouth, the trail follows for a quarter of a mile close to the shore of Brulé lake and ascends to the top of some timbered ridges which shut off the valley of Solomon creek from the south. Shortly after it debouches in the prairie lands previously referred to. The right branch of this trail turns more to the southwest and skirts the western edge of the forest at the foot of Solomon mountain, crossing Solomon creek three or four miles above its confluence with the Athabaska, whence it leads also to the prairie lands adjacent to the west shore of Brulé lake. These lands could also be reached from the south by a road which leaves the main Yellowhead pass road close to Stony river but in my opinion the others are shorter and easier to travel.

Above Brulé lake, Athabaska river divides into innumerable channels, separated sometimes by wooded islands but more frequently by large gravel bars covered with large quantities of drift wood through which grow thick willows.

Where it issues from the lake the river is confined to a single channel and a quarter of a mile below the lake it turns to the northeast. Here its channel is obstructed by large boulders. With this exception its course is remarkably free from obstacles and continues in one channel, only an occasional wooded island being encountered, till at Trail creek, one of its eastern tributaries, another rapid occurs in a sharp bend of the river. A bad canyon, however, is reported to exist somewhere near the confluence of this river with Baptiste river.

On December 5, having completed the survey of the sixth meridian as far as instructed, I started for Athabaska river, crossing on the way Stony river near the place where it leaves the mountains. The river which here runs in a single channel is quite deep and very swift, but I found a better ford half a mile farther down

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where it divides into several shallow channels spreading through a wide stony flat. After crossing this river the trail which we had followed thus far, connects with the Yellowhead pass trail. From the junction of these trails, we travelled through an extensive prairie as far as the left bank of the Athabaska, which we forded without difficulty, as it was still free of ice at that late date. This is the place where all pack trains bound for Yellowhead Pass cross the Athabaska. It is a long and intricate ford, and its crossing should not be attempted at high water by parties unacquainted with the location of the different gravel bars which have to be partly followed. There are many channels to cross, some of them quite deep and swift. This network of channels is a feature of the river in this vicinity. Below the crossing they extend to the head of Brulé lake, where years ago there used to be another ford just where Drystone creek enters the river from the east; but the gravel bars here having been partly washed away, the ford is not practicable to-day except at very low water.

On December 6 I continued my journey along the right bank of the river and camped that night on Fiddle creek, one of its eastern tributaries.

The approach to Fiddle creek from the north may be properly called the gateway to the Rocky mountains in the neighbourhood. Their massive escarpments of grey limestone rising in successive tiers to seven and eight thousand feet above the sea add much to the landscape on both sides of Athabaska river, and the scenery compares favourably with that of other sections of the Rockies.

In the angle formed by the valleys of Fiddle creek and Athabaska river stands 'Roche à Miette,' a prominent landmark, visible from a long distance. It is the abrupt western termination of the high range of mountains which divide the valleys of Drystone and Fiddle creeks. This last stream flows from east to west through a deep narrow gorge, cut through rugged and high peaks. At about three mile up one of its southern affluents are several hot springs; two of them are reported to have a very high temperature. From the junction of these streams it is about twelve miles to the valley of Athabaska river. At present it is difficult to reach these hot springs, for the only path which leads to them is very faint in many places, and winds high up the precipitous sides of the mountains south of the creek.

On December 7, we left Fiddle creek and two and one-half miles farther forded Drystone creek, another mountain stream. One mile north of the ford we came to pine and spruce woods on the divide between Drystone creek and Prairie creek. The forest gradually disappears as one travels northward and within four miles of Jock's house the country which has been burnt over repeatedly has a generally open appearance. Through this flows Prairie creek and three miles above its confluence with Athabaska river stands Jock's house. Here Jock and his partner J. J. Gregg, settled eighteen years ago and for a long while theirs was the only habitation between the new settlements at the eastern extremity of Chip lake and Moberly's ranch at the foot of the mountains. Lately it became the distributing point for several parties of engineers sent by the Grand Trunk Pacific company to explore the passes for their railway. Though the land along Prairie creek is fertile, very little cultivation has been done by these men who divide their spare time between trading with the natives and ranching for which this country is well adapted.

As a result of the warm Chinook winds which frequently blow down the valley, the winters here are not severe and the fall of snow is so light that hay is never put up for cattle or horses, nor shelter provided for them.

On a small tributary which springs from the hills east of Prairie creek into which it flows, beds of coal have been discovered and coal claims were staked during last summer.

A pack trail seldom travelled by whites, starts from Jock's ranch and proceeds eastwards along the valley of Coal creek which it follows to the divide, it continues in the same direction till near McLeod river it meets another trail running at right

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angles to the former and which connects 'The Leavings' on McLeod river with the head waters of McLeod, Pembina and Brazeau rivers. At first I intended to reach the big eddy of the McLeod by following this trail and thus examine this new section of country so as to be able to report on it but, being informed that the grain ordered for the return trip to Edmonton had not yet been delivered, I reluctantly gave up my project and had to take the old yellowhead pass trail, which follows the right bank of Athabaska river to its intersection with the fourteenth base line where I knew oats had been cached by Mr. Geo. Ross, D.L.S.

The country adjacent to the trail connecting Athabaska river with the big eddy of McLeod river is so minutely described by Mr. Geo. Ross who surveyed the fourteenth base line which runs through it that I need not further refer to it.

To sum up, the larger portion of the country visited last summer, if we except some scattered areas of arable land which have proved productive, will be more suited to stock-raising than to farming, after the land which is quite rough and has a light soil, has been cleared of the windfall which at present covers the greater part of it. In many places along the valleys of the largest streams will be found bluffs of spruce and poplar, and clumps of thick willow which make fine shelter for cattle. In the intervals are patches of prairie land and hay meadows, some of them quite large.

During the summer while engaged in the survey of the sixth meridian, I never missed an opportunity of taking measurements from proper elevations along the line to all the most prominent peaks of the Rockies which came into view.

With these data I have worked out their altitude above the sea and also the position of these mountains relatively to the sixth meridian, but, owing to the greater elevation of the country west of the sixth meridian and sometimes also to thick bush near my stations no outlook to peaks farther west than thirty-five miles could be obtained. Beginning at the valley of the Athabaska and proceeding westward we have the Bullrush mountains which extend eastwards beyond the sixth meridian, northeasterly they extend to Solomon creek and southwesterly to stony river. To the northwest they are separated from the main range of the Rocky Mountains by Hay river, which flows out of Rocky lake fed by mountain streams. Extensive prairies surround this lake which is much frequented by the natives during the summer as its vicinity affords ideal camping grounds. South of the lake is a low divide between the valleys of Hay and Stony rivers which approach within half a mile of each other.

Northwest of Bullrush Mountains from which they are separated by the valley of Hay river are other mountains presenting a fairly regular outline bearing north 70° west and apparently terminating twenty miles farther at a conical shaped peak (altitude 8,850 feet). From that point the mountains seem to recede towards the southwest.

Returning to the valley of the Athabaska and looking southwards from the middle of the east boundary of section 1, township 49, on the sixth meridian, one cannot help noticing an isolated high peak (altitude 9,100 feet) of pyramidal shape and standing apparently in the middle of the valley. In reality it occupies the angle formed at the entrance to Yellowhead pass by Athabaska and Miette rivers. Near the base of this peak stood the old 'Henry House,' a trading post long ago abandoned. On Capt. Palliser's map this peak is called Pyramid Mountain.

Of the mountains east of Athabaska river the most prominent summits of the range separating Drystone creek from Fiddle creek were determined as far east as the sources of McLeod and Pembina rivers.

As for the next range rising north of Rocky river, only these mountains at its western extremity and a few peaks near the head waters of this river were located, as the intermediate peaks are hidden from view by the first range above mentioned.

Regarding the climatic conditions in this country, I may state that up to the middle of August we suffered great discomfort and experienced vexatious delays due to continuous heavy rains, often followed by ten or twelve inches of snow, which,

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however, would melt away in a few days. I may also add that in midsummer, ice half an inch or more in thickness frequently formed during the night on water left in receptacles in my tent. Such unusual occurrences could, however, be accounted for by keeping in mind the great elevation (4,400 feet) of the country.

These daily outpours which had prevailed in the district where I was surveying so long as we remained thirty or forty miles away from the mountains, gradually decreased in frequency and intensity the nearer we got to them. The reason for this change is apparent. Western storms originate in the mountains, as on any bright day we could plainly see the clouds forming around the highest peaks. In the interval a vacuum is caused in the superheated air on the plains to the east. Hence the rush of the colder air from the higher altitude towards the lower level of the plains, carrying before it the storm clouds; precipitation from those would begin only when at already some distance from the origin. However, these may be only local conditions.

To compensate for the disagreeable weather of the early part of the season we were favoured with the finest fall weather it has ever been my luck to experience in the northern country, and up to November the days were balmy; as there was very little snow on the ground the survey work could be carried on without interruption.

Large game is plentiful in this country and consists of moose, along the valleys of Baptiste and Hay rivers; black, cinnamon and silver-tip bears are numerous throughout. Mountain sheep and goats live in the foothills and appear in great numbers west of Brulé lake. Beavers were noticed at work on the headwaters of Simonette river and on some tributaries of Baptiste and Hay rivers. Small game, such as grouse, rabbits and waterfowl are scarce, but the lakes are teeming with whitefish and pike; and in the running streams trout of many species were caught.

On December 7, I returned with my outfit to Gregg's ranch, near Prairie creek, and arranged with him for the transport to Lake St. Ann of part of my outfit, some of my pack horses being so poor as to render them unfit to carry heavy loads on such a trip at that season.

On December 9 we left for Lake St. Ann, which we reached on the 20th. Three days later I was in Edmonton.

On the 26th, having received the necessary funds, I paid off the party and on the 29th left for Ottawa, where I arrived on January 2.

I have the honour to be, sir,
Your obedient servant,

A. SAINT CYR, *D.L.S.*

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APPENDIX No. 35.

REPORT OF J. B. SAINT CYR, D.L.S.

SETTLEMENT SURVEYS IN PEACE RIVER DISTRICT.

MONTREAL, February 24, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report on my field operations during the past season in Peace River district.

In accordance with your instructions, dated March 1, 8 and 15, 1907, I left St. Anne de la Perade on March 22 for the west. I arrived in Edmonton on the 29th of the same month. I began making the necessary arrangements and hired the men, and on April 10, I left Edmonton with three teams. On the 13th we arrived at Athabaska Landing and on the night of the 17th, we reached the lower end of Lesser Slave lake. On the evening of the 25th we arrived at Peace River landing, where the ice had broken two days before. The banks and shores of the river were regular walls of blocks of ice and a place for landing could not be seen on either side of the river. In order not to stay idle waiting for a more favourable chance to cross, we commenced the subdivision of Peace River Landing settlement and worked at it until May 6, when we could take my outfit across the river.

On May 8, we left Peace River landing on our way to Dunvegan, where we arrived on the 11th. On the 14th and 15th the teamsters which I sent for, came to Dunvegan and took my outfit to Spirit river, and on the 17th of the same month we started the survey of Spirit River settlement. Before giving any description of this Spirit River country, I will mention 'Little prairie,' about twenty miles southeast of Peace River landing on Lesser Slave lake trail as a good location for some future survey. There are a few squatters there and each one of them is very anxious to have a surveyor locate him and to make some subdivision. There is quite a long stretch of good country, prairie and bluffs at 'Little prairie' along the wagon trail.

North Heart river drains that country, furnishing a permanent supply of good water. Timber for building purposes is also plentiful in the vicinity of 'Little prairie,' and in fact all along the trail. Peace River landing is a very small flat, surrounded by hills ranging from six hundred to eight hundred feet above Peace river. The flat itself is about fifteen feet above the river at low water. The greater portion of that level land was surveyed by me in the spring, as above stated.

Eight miles above Peace River landing and on the west side of the river begins Shaftsbury settlement, occupying a narrow but very long flat of the best soil. The crop raised this year in that settlement was magnificent, the oats and wheat being of the highest grade. Squatters are scattered from this settlement to Peace River landing along the river waiting for the survey of this tract of land. The country there is undulating and gently rolling, but the soil is comparatively good. From Shaftsbury settlement two trails, one southwest and the other west, diverge for a certain distance to meet again east of Burnt river, forming there the Dunvegan wagon trail. The more southerly trail crosses a very good farming country. The soil is richer and contains more moisture than on the upper trail. A spring creek

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flowing through township 81, range 25, west of the fifth meridian, runs both in winter and summer, supplying the best of water. Hundreds of settlers could locate with those already established there. The subdivision of a few townships in that vicinity is urgent. On the other trail the country is mostly prairie with the exception of the land bordering on Burnt river, where it is prairie and bluffs. Later on townships 82, 83 and 84, range 1, west of the sixth meridian, might be subdivided and afford a good location for newcomers. Burnt river runs until late in the summer and timber for building purposes is plentiful along its banks. The country has a very fine aspect and is nearly level.

Dunvegan as well as Peace River landing is another navigation point. The flat on the north side of Peace river is all taken up; it is surrounded by hills varying from 400 to 600 feet high. The survey of that settlement will probably be completed next summer. A belt of timber six miles wide borders Peace river on the south side along Spirit river road. South of that timber the country is prairie and bluffs. The land is gently rolling from the timber towards the south for about four miles, where it begins to be level as far as Spirit river, a distance of about nine miles. The open country around Spirit river extends about ten miles to the north, eight miles to the southeast, four miles to the south and about fifteen miles to the northwest. All this land is well adapted for farming and ranching purposes. Spirit river with a few lakes here and there furnishes a good supply of water nearly all the year around. Timber for building purposes and wood for fuel are plentiful. The climate is very good in all that district and early summer frosts are not frequent. There are a few squatters on the Dunvegan road, north of Spirit river, asking for subdivision survey in that direction next summer. The grain and vegetables raised there last summer were exceedingly good. The people of that country are satisfied so far. Settlers will certainly before long join those pioneers of the country.

The survey of Spirit river settlement was commenced on May 17 and was completed on June 22, 1907. The settlement lies on both sides of Spirit river with two rows of lots. It measures about four and a half miles from east to west by about two and a quarter miles in depth and contains fifty-nine lots of different sizes all of the best farming land. The people of that settlement are well encouraged and expect to have a saw-mill in operation next summer and to have threshing machines and a boring outfit, as they intend to bore wells in different parts of the district.

Following out my instructions, we left Spirit river on June 23 on our way to 'Grande prairie, where we arrived on the 26th of the same month. We first surveyed the north, east and west boundaries of townships 72 and 71, range 6, west of the sixth meridian and subdivided a portion in each township, also Flyingshot Lake settlement, in township 71, range 6. These surveys commenced on June 24, and were completed on August 20. 'Grande prairie' had a very fine appearance this summer and no better grazing land and hay land can be seen anywhere. The surface is prairie and bluffs, gently undulating. The soil is a deep black loam and deep black sandy loam overlying a clay or sandy clay subsoil. That open country may extend from east to west about forty miles and nearly twenty-four miles from north to south. Streams cross the country in all directions and there are also a few good sized lakes of soft water. Timber for building purposes is plentiful and can be procured almost everywhere. The land is suitable for farming and ranching purposes. The climate is very good and early summer frosts are not frequent. Vegetables and grain are successfully raised there. The few scattered squatters of 'Grand prairie' appear to be satisfied and have great faith in the future of that country, which is large enough to make a province by itself. The means of communication for reaching that district are improving every year and people can travel with more comfort and in less time to that northwestern country than before. I never witnessed such fine weather anywhere as last fall in that district. Having completed the above mentioned surveys in 'Grande prairie' we came to Spirit river to outfit for further surveys north of Birch hills and across Brulé river, Spirit and Peace river as far as the twenty-first base line.

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On August 27, we left Spirit river for Grizzly Bear prairie where we arrived two days later. That prairie is nothing but a narrow strip of prairie following a wagon trail, as far as township 77, range 2, west of the sixth meridian, a distance of about twenty miles from Spirit river. According to additional instructions received in August we began the survey of the east boundaries of townships 77, 78; 79 and 80, ranges 3 and 4 and made the subdivision of township 78, range 3, west of the sixth meridian. These surveys were commenced on August 30 and were completed on December 24. The country surveyed is mostly thick bush with the exception of that portion of township 77, range 3, situated north of Birch hills, which is prairie and bluffs. The remaining portion of that township, viz.: four miles by six miles on Birch hills, is thickly timbered with spruce, poplar, birch and large willow with patches of jackpine here and there. The spruce timber is of good quality and suitable for lumbering purposes. The average height of Birch hills above the prairie is about two hundred and twenty-five feet. In township 78, range 3, half way between Brulé river and the wagon road, there is another belt of fine spruce timber suitable for making lumber extending nearly five miles from west to east with an average width of about a mile. The soil is fairly good from the foot of Birch hills to a mile north of the trail, but in the remaining portion of township 78 and all township 79, the soil is of inferior quality and thickly timbered with poplar, spruce and large willow with windfall here and there. The hills bordering Brulé river in townships 78 and 79, range 3, west of the sixth meridian vary in height from three hundred to four hundred feet. Those of Spirit river in township 79, range 3, average two hundred feet in height, while the hills of Peace river in township 80, range 3, are from four to six hundred feet high. In this last township the surface is prairie and bluffs, viz.: for that portion situated on the north side of Peace river. The soil is very good and well adapted for farming and ranching purposes. There is a narrow flat on the river bank in that township, called 'Green Island' flat; it is about two miles long and is all occupied by squatters outside of the Indian reserve. From the top of Peace river hills as far as the view extends the country is level.

While travelling on Spirit river and in making the traverse of Brulé river, I noticed in the cutbanks oxide of iron here and there. Pieces of coal were also found in the cutbanks of Spirit river, in township 79, range 3. I am sending to the department some specimens gathered on the above mentioned rivers.

On December 27 we went to Dunvegan to survey a portion of township 80, range 4 west of the sixth meridian, and to make some measurements in Dunvegan settlement. On January 7, 1908, we left for Peace River Landing, where we made a traverse from the twenty-second base line to the northwest corner of Peace River Landing settlement. It took two days to perform this work, and I started afterwards for Edmonton, where I arrived on January 23, and at Ottawa on the 29th.

From what I have seen these last two years and also from reliable information from the residents of Peace river district, I must say that regarding the climate, the quality of the soil, the hay, the water supply, the timber, &c., this northwestern country has more advantages than the other parts of the west. The days are much longer in summer and the grain and vegetables grow more rapidly than farther south. The fall is much nicer and not so cold as in many parts of the west, and also the spring is comparatively early. Means of communication are getting better every year, so that there is nothing to prevent settlers from going into that country, where they can make a success of mixed farming. When the district is more settled that will certainly induce the railway companies to build a line to that country. I believe that in the near future it will prove to be exceedingly good as a farming and ranching country.

I have the honour to be, sir,

Your obedient servant,

J. B. SAINT CYR, D.L.S.

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APPENDIX No. 36.

REPORT OF B. J. SAUNDERS, D.L.S.

SURVEY OF PARTS OF THE FOURTH AND FIFTH BASE LINES EAST OF THE PRINCIPAL MERIDIAN

EDMONTON, ALTA., August 3, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on the survey of the fourth base line through ranges 13, 14 and part of 15, and the fifth base line through ranges 13, 14, 15, 16 and 17, east of the principal meridian, in the province of Manitoba, surveyed under your instructions, dated May 25, 1906.

Having undertaken some private surveys before receiving your instructions, I was unable to proceed with this base line work until early in the autumn of last year. In any case, from knowledge gained of the conditions of the country, I considered it advisable to defer the work until the swamps and muskegs had partly dried up.

I shipped my horses and outfit from Edmonton to Winnipeg on September 21, via the Canadian Northern railway, and they arrived in Winnipeg on the 28th. On the following day I went to Lac du Bonnet and Whitemouth to look the ground over before deciding which base line to start first, and from what I learned, made up my mind to proceed with the fourth base line and leave the fifth base line until winter time, when the ice had formed on the lakes and rivers.

Having found out that no men were available at Whitemouth, I organized my party in Winnipeg and returned to Whitemouth on October 9, where my assistant had been engaged for the previous week examining the country east of Whitemouth to find a convenient route into the northeast corner of township 12, range 12. Two or three days were spent in getting the camp in shape, road-making and building a temporary bridge across Bog river, as well as forwarding supplies.

On October 13 we moved camp from Whitemouth to the east side of Bog river, on section 2, township 12, range 12, to within six or seven miles of our starting point, and by the end of the following week got the camp to within three-quarters of a mile of that point by making use of an old timber road.

On Saturday, October 20, the production of the base line was started from the northeast corner of township 12, range 12, and the work was carried on until December 15, by which time we had reached the northeast corner of section 34, township 12, range 15. Work was discontinued at this time in compliance with your letter of December 4, instructing me to proceed at once with the survey of the fifth base, so that the subdivision of the townships adjacent thereto could be undertaken at an early date.

As embodied in the reports of the several ranges through which this (fourth) base line passes, the country consists chiefly of rocky land and muskeg, and has been more or less burned over. In my opinion, very little of it is adapted for agricultural pursuits.

At the present time there is practically no timber left that would be of use for lumber. In ranges 13 and 14 there is a fair amount of standing dead timber that could be utilized for firewood, and in favourable seasons could be hauled to Darwin

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station on the main line of the Canadian Pacific railway. The wood industry east of Winnipeg has become quite important, and large quantities are shipped to that city during the winter months from Molson, Whitemouth and Darwin, on the main line of the railway, and from all the stations along the Lac du Bonnet branch north of Molson.

Around Whitemouth mixed farming operations are carried on to a large extent, hay being one of the chief commodities grown. Timothy and clover grow luxuriantly and are easily marketed.

At the present time extensive operations are going on in railway construction in double-tracking the main line of the Canadian Pacific railway and in the construction of the new Transcontinental line which passes only a few miles south of Whitemouth.

The fourth base line crosses Whiteshell river near the east side of range 14 and again in range 15 at the point where the survey was discontinued. This river forms the drainage channel of Whiteshell and Cross lakes, and of other lakes in that neighbourhood. It widens out a number of times into lakes between which there is usually a small fall or rapids.

No economic minerals were met with.

On Sunday, December 16, camp was struck and a start made back to Whitemouth where we arrived on the following day. Two or three days were employed in purchasing hay and oats and shipping them by rail to Lac du Bonnet. On the following Saturday we started across country with the camp, over a fairly good winter road for Lac du Bonnet station, reaching that point the next day. Our car having arrived it was unloaded on the 26th, and the greater part of our supplies stored. Early the next morning a part of the camp pulled out for the fifth base line and camped that night at the mouth of Oiseau river near the northeast corner of Lac du Bonnet proper. The few days following were spent in taking up the line in range 12 and waiting for an observation for azimuth. Having been at length successful in getting a satisfactory observation, the survey of this base was commenced on January 6, and on March 12 it was completed to the east side of range 17.

The survey of this base line was found to be a very difficult and trying piece of work owing to the great depth of snow which prevailed last winter, combined with the intense cold.

The country along this base line consists chiefly of rocky formation broken by muskegs. Lac du Bonnet extends about a mile and a half into range 13. Adjacent to the north boundary of township 16, range 15, there is a lake about two and one-half miles in length. In range 16 there are three lakes adjacent to and intersected by the line, while in range 17 as many as five lakes are so situated. The end of the line established falls in a lake some three or four miles in width.

The shores of these lakes generally speaking are rocky but owing to the quantity of snow on the ground we were unable to judge of the probability of their carrying minerals of economic value. I do not consider any section of this country adapted to agricultural pursuits.

In range 13, adjacent to Lac du Bonnet, there is some fair sized timber consisting of spruce and poplar, while in the other four ranges the timber is very small and of no merchantable value. It consists chiefly of second growth, pitchpine, poplar and spruce.

At the present time that portion of Winnipeg river lying to the south of this base is attracting considerable attention in connection with the development of water-power for the transmission of electrical energy to Winnipeg. At Point du Bois falls in township 15, range 14 and 15, the city of Winnipeg has called for tenders for the work in connection with the installation of a power plant to develop about twenty thousand horse-power. On Pinawa channel of Winnipeg river the Winnipeg Electric company have a large power plant in operation and for over a year have been transmitting electrical energy to Winnipeg, a distance of some sixty or seventy miles.

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During the past winter they have been improving their water supply by the construction of a wing dam to divert a greater flow of water from the main stream into this channel.

I have the honour to be,
Sir,
Your obedient servant,

B. J. SAUNDERS, *D.L.S.*

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APPENDIX No. 37.

REPORT OF B. J. SAUNDERS.

SURVEY IN THE PROVINCE OF MANITOBA.

Edmonton, April 29, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour, in accordance with my instructions, dated August 23, 1907, to submit the following report on the survey of block outlines east of the principal meridian in the province of Manitoba, made the past fall and winter.

Having engaged a packer, I shipped my horses and outfit from Edmonton to Winnipeg on September 26, via Canadian Northern railway; they arrived in Winnipeg in due course and were transhipped via Canadian Pacific railway to Selkirk. Having organized my party in Winnipeg and purchased my supplies, I chartered the steamer *Mikado* to take the whole outfit from Selkirk to Fort Alexander, near the mouth of Winnipeg river, where we arrived on October 16. After obtaining permission from the officer in charge of the Hudson Bay Company's post at Fort Alexander, camp was pitched on the company's reserve.

The following day I began looking for the starting point of my survey at the northeast corner of township 18, range 8, east of the principal meridian, by going in almost directly west of the fort, but was unsuccessful in finding the objective point on account of the great difficulty in getting about in the deep water which covered the whole of the muskeg lying in that direction. Finally, I decided to go around by boat to Catfish creek, and follow that stream up to the Indian reserve boundary, and then go along this boundary and run a trial line into where I computed the northeast corner of township 18, range 8, should be found. This method proved successful, and the remains of the post marking this corner were duly located, also the bearing tree which witnessed the position of the post. Having obtained observations for time and azimuth, the work of running a meridian north was commenced for the purpose of locating the northeast corner of township 19A, range 8, in accordance with your supplementary instructions of October 11. This line runs through fractional township 19, range 8, Fort Alexander Indian reserve, and across Traverse bay, at the mouth of Winnipeg river.

By the time I got the triangulation made across Traverse bay, the weather had become very stormy, with prevailing high winds, alternating between southeast and northwest, but we were able to get some of our supplies moved down the east side of Lake Winnipeg as far as Black river Indian reserve, taking them down by sailboat. From November 15 until near the end of the month we were practically tied up on account of climatic conditions. During this time, ice formed across Winnipeg river at Fort Alexander three times, and was broken twice by the winds and spells of mild weather. This interval was employed in building a stable for the use of our horses when coming to the fort for supplies during the winter, and in getting flat sleighs made, and generally preparing for the winter's work.

On November 30, the ice in the river having become sufficiently strong to carry a man, work was resumed on the line, and on December 4, with two men, three horses and flat sleighs, I moved some supplies down the lake about twelve miles from Fort

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Alexander, and on the following day moved camp to Spruce point, a little further down the lake shore.

From this time on, the work progressed quite satisfactorily. The meridian outline was run between ranges 8 and 9, from township 19A to where this outline strikes the east shore of Lake Winnipeg, in township 26, also the sixth base was run east from this outline across range 9 east and west about half a mile to the shore of Lake Winnipeg in range 8. Similarly the seventh base was run across range 9, and west a little over four and three-quarters miles to the shore of Lake Winnipeg, in range 8.

All the country traversed by these lines is practically flat, with the exception of that along the north half of the line through township 25. A few rocky ridges are met with on both base lines in range 8. These rocks belong to the Laurentian formation and their general direction is northeast and southwest. The timber met with is mixed in variety and consists of spruce, tamarack, balsam, poplar, and birch with pitchpine on rocky ridges. Some elm and ash were noted at different points along the shore of the lake. The land is of rather poor quality, and is very wet on account of its being so flat and only about eight or twelve feet above the level of lake Winnipeg. It is not adapted to agricultural pursuits in its present condition.

Fort Alexander is an old and important post of the Hudson's Bay company, having been established in the early days of the company. It is situated on the southwesterly or left bank of Winnipeg river about three miles up from its mouth. The company's reserve consists of some six hundred and fifty acres and is situated within the Fort Alexander Indian reserve. This Indian reserve extends along both sides of Winnipeg river, a distance of nearly ten miles from its mouth. There are two Church of England schools, and one Roman Catholic school on the reserve. The latter is a large and modern structure having accommodation for about one hundred and fifty children for both residence and tuition.

Above Fort Alexander there is a farming settlement known as St. George settlement stretching along the river a distance of ten miles or more and as far up as Silver falls on Winnipeg river. At this falls it is proposed to develop water-power for generating electricity. There are also two sawmills near Fort Alexander and St. George, the surplus lumber manufactured being shipped to Selkirk by water during the period of navigation.

In township 21 and 22, ranges 8 and 9, is situated Black River Indian reserve at the mouth of Black river. There is a Church of England mission school here.

The Indians of this reserve, like those at Fort Alexander, find employment in fishing, cutting cord wood and railway ties and similar work. In township 25 the meridian outline between ranges 8 and 9 crosses the mouth of the Manigotagan or, as it is locally known, Bad Throat river. On this river there is a settlement also, but agricultural pursuits are not followed to any extent worthy of note. There is a large sawmill at Manigotagan belonging to the Lake Winnipeg Lumber company but nothing was being done last winter towards getting out logs for this summer's cut. The country around Manigotagan has been lumbered over quite extensively for some years.

The meridian outline between ranges 8 and 9 crosses a number of small bays of Lake Winnipeg in townships 20, 21, 22 and 25, and intersects the lake shore again in township 26, where the line was discontinued as instructed. The production of this line will cross the northeast end of Black island, one of the largest in Lake Winnipeg.

Opposite the end of the line, to the east, lies the mouth of Wanipigow, or as it is locally known, Hole river. Hole River Indian reserve is situated at the mouth of this river and the Hudson's Bay company has a trading post there.

About half a mile east of the line at this point, there is a gold prospect which has been worked for some years, but on account of lack of capital not much progress has

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been made. I have noticed recently from press reports that a company has been formed to thoroughly exploit this prospect. On Black island during the past winter work was being carried on in opening up an iron ore location.

On Saturday March 15 we started back for Fort Alexander, arriving there the next afternoon. A halt was made for two days to straighten up business matters and to wait for the incoming mail, before proceeding to the fourth base line northeast of Whitemouth, where work was discontinued in December, 1906. We proceeded to Whitemouth by way of Lac du Bonnet station which was reached in two days by the winter road through St. George and up along Winnipeg river and Lac du Bonnet. From the latter point a timber road was taken across what is known as 'The Island' lying between the two branches of Winnipeg river. We struck the main river again above the seven portages and having crossed over were able with some difficulty and danger to pick our way down along the shore ice to where we found a settler's trail a short distance above Whitemouth river.

Whitemouth was reached on Saturday, February 22. A few days were spent here in getting supplies down from Winnipeg and in purchasing horse feed. On the following Friday the whole outfit was shipped by rail to Dagero station on the Canadian Pacific railway. From this station I took a contractor's road in to the Transcontinental railway line for a distance of five miles, and then followed down a small lake to the Cross lake waters. Proceeding down these waters a temporary camp was made near their junction with the waters coming from Whiteshell lake to the north. On March 4 the end of the fourth base line was located at the northeast corner of section 34, township 12, range 15 where its survey was discontinued in December, 1906. Having taken up the line it was produced east to the east boundary of Manitoba, which it intersects just south of the forty-fifth mile post on that boundary as located by the Ontario and Manitoba boundary commission of 1897. This intersection is near the east side of range 17.

The portion of the line surveyed in March is similar to that described in my former report on this line with the exception that more lakes are met with. As a matter of fact the whole country from range 15 to the Ontario-Manitoba boundary is a network of lakes. Moose and caribou are found in large numbers and in their season duck are very plentiful on account of the large fields of wild rice on and along the lakes. It has frequently struck me that a large portion of eastern Manitoba should be set aside as a park, forest and game preserve, for which purpose it is almost ideal, besides it is not adapted to agricultural pursuits. After the completion of the new Transcontinental railway it will be still more easily accessible and should become of great interest to people desiring to get away from the cares of business life for a holiday season.

On March 29 we returned to Dagero, and having arranged for a car I shipped my horses and outfit to Winnipeg the next day. I had them transferred to the Canadian Northern railway at Winnipeg on March 31.

On the whole, last winter was a favourable one for field work, and although we had a number of cold dips they were not of long duration.

In conclusion I desire to express my thanks to the commissioner and officers of the Hudson's Bay company at Winnipeg and Fort Alexander for the assistance they gave me in every possible way, and I also must express the same feeling towards my assistant, Mr. G. W. MacLeod and several members of the party for their unflagging interest in the prosecution of the work.

I have the honour to be, sir,

Your obedient servant,

B. J. SAUNDERS, *D.L.S.*

APPENDIX No. 38.

REPORT OF HENRY W. SELBY, D.L.S.

SURVEYS IN NORTHERN ALBERTA.

TORONTO, January 31, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on the survey of township outlines, and the subdivision of lands situated at the west end of Lesser Slave lake, which has been done in accordance with your instructions, dated February 26, 1907. Upon receipt of these, the necessary supplies were ordered by telegraph and sent in on the ice. On April 25 I left for Edmonton, where my party was organized. We arrived at Athabaska Landing on May 14 in time to take the first York boat on Athabaska river for Lesser Slave lake. We arrived at the lake on May 22, but could not cross it as the ice had not yet broken up. The boat was unloaded there, and went back to Athabaska Landing for another load. Teams and wagons were engaged to transport the party and baggage around the north shore of the lake, rather than await the return of the York boat. This, owing to the low stage of the water, is not at all difficult to do, as the beach is wide, and with the exception of about ten miles of boulders is good for travelling with waggons, but it is bad for that ten miles and it cannot be avoided, until a road is cut through the woods along the shore. This, it is expected, will be done during the next year by the provincial authorities. It may be stated here that prospective settlers and others may, during the time of high water in the rivers (usually about two to three months) take passage by steamer at Athabaska Landing to the mouth of Lesser Slave river, thence by wagon road to the head of the rapids, about twenty miles, where another steamer can be taken to the west end of Lesser Slave lake, by this means making the trip in three days, which ordinarily takes from eight to ten days. Contractors are now putting in wing-dams on Lesser Slave river. A dredge was at work all fall until ice formed, and it is expected it will continue next spring, to deepen the channel where necessary, so that steamers may go up the rapids, and, without breaking bulk, deliver their load at its destination. If this can be done, it will be a great convenience to those who are obliged to make this journey. The season for surveying being considerably longer than for navigation renders this means of transportation of little value to the surveyor.

A ferry has been put in across the Athabaska river at Athabaska Landing, and a wagon road cut out from the ferry landing to Moose portage, where it connects with the road cut by me in the spring of 1904 to Lesser Slave lake, and from the east end of the lake, a proposed road has been blazed around the north shore, to avoid the boulder strewn beach. This follows the beach, when the travelling is good to Lesser Slave lake, and the Peace river road, so that it will be quite possible to travel by wagon from Edmonton to Dunvegan, without encountering insurmountable difficulties. Those of us who have seen this gradual development look upon the task of getting into the Peace river country now as quite an easy one for light loads. The building of the railroad from Edmonton to the Pacific coast via Sturgeon lake and Grande prairie, the contract for which is reported to have been awarded, will make some difference in the cost of freighting supplies. At present freight costs \$3.25 per 100 lbs. from Edmonton to the west end of Lesser Slave lake, and at the season when roads are bad

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from Sturgeon lake to Lesser Slave lake it costs \$3 per 100 lbs. and the same from Lesser Slave lake to Peace river landing, a distance of about 90 miles over a road on which many thousands of dollars have been spent. The traffic over those roads is largely composed of heavily loaded wagons, which cut into the newly made road of clay from large portions of which the sun's rays are excluded by the dense growth of timber on each side. It is noticed that upon such portions of the road where the sun's influence is felt, the clay hardens, and it is not so easily cut up, once it gets dried out in the spring. Freight rates are regulated by the quantity hauled per team and the time occupied in making the trip; consequently the condition of the road is the prime factor in fixing freight rates, on a dry season the rate being little more than half that on a wet or rainy season. Last summer it took me two and a half days to move my outfit over a road, which when dry can be travelled easily in one day, and both man and beast are in better heart at the end of the shorter period.

Arriving on May 27 at the warehouse near the Hudson's Bay company's post, where my supplies had been cached, I delayed only long enough to check over and re-pile these, get the outfit in order, axes hung and ground, and other needed repairs made, and on the 29th moved into township 75, range 14 west of the fifth meridian. The timber is in belts of quite heavy spruce and poplar, but this is being cut every year and made into lumber, and fire has over run these cut-over areas, leaving them much easier to clear. There is no reason why this land should not be soon occupied, adjoining as it does a large settlement where the timber is required for building purposes, a wagon road cutting across it to shorten the distance around Shaw's point, and the soil being excellent for farming purposes and lying with a gradual descent towards the lake. Although there are no hay lands, except on the west boundary, still hay is found in townships 75 and 76, range 15, which is sufficient for a large population for many years.

Portions of townships 77, ranges 15 and 16, were subdivided because the Peace river road furnishes access to them, and when cleared of the light timber they will make beautiful farms. These sections are well supplied with good water, and the prairie spots seen furnish abundance of hay and vegetation.

Townships 74 and 75, range 15, have large areas of prairie, and several settlers have made small improvements. Wheat, oats, barley, potatoes and other vegetables were grown this year, and although there had been a great deal of injury from frost throughout the Northwest, still very little harm had been done here.

The main roads from Lesser Slave lake to Sturgeon lake pass through these townships, and the timber being small when found alongside of them, they are generally good. No public money has been used to open these roads, but when a little can be obtained for culverts, bridges and draining water holes, settlers will have little difficulty in reaching the objective points, Lesser Slave Lake post office and the half dozen stores, blacksmith shops, churches, &c.

The large number of cattle and horses seen throughout this country, invariably in good condition, goes to prove that, with foresight enough to provide for a severe winter, should it come, stock-raising should be profitable. Township 74, range 14, is composed mainly of timbered land, the trees generally being of small size and not standing very thick. The soil is black loam on clay, and evidences its fertility by the thick growth of grass among the trees and willow bunches. A slight descent towards the north and the climatic influence of a large body of water alongside of it should make this, when cultivated, a fine agricultural area. A wagon road from Lesser Slave Lake post office crosses the lake at a ford near Willow point. This ford permits of a wagon being drawn across empty, a canoe or boat being used to convey the load over. I was informed before leaving this work that the provincial authorities contemplate building a bridge across the lake at this point, which will be a great convenience, and which has now become a necessity. After leaving the ford the

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road follows the beach easterly and southerly, crossing a creek near its mouth, where the water is 75 feet wide and from one to two feet deep, and a smaller creek about a mile farther on, where the water is about a chain wide and nine inches deep, the bottom being good in both cases. Neither of these creeks has much water in it over a mile up from the shore, where in the event of the water of the lake rising and covering the beach a road could be easily made. The width of the creeks being so much less, only small bridges need be built. The road follows the beach, except at a few points where the shore is rough with boulders, easterly to Driftpile Indian reserve, where it runs inland and still easterly to Swan river. Several settlers who have located near the nineteenth base line in range 10 use this road to get to the post office and stores. There is also a wagon road running southerly through township 74, range 14, leaving the lake shore in section 14, which I travelled to the nineteenth base line, and found fairly good that far. It is cut through to Edmonton. At least I was told so by a settler named Beaudry, who drove to that place in October, but on account of having cattle to bring back in November, came around by Athabaska Landing and Lesser Slave river, where he could get hay to feed his cattle. Several parties came into the lake by this road, but all agree that it is very hilly and requires a good deal of fixing, numbers of trees having to be cut out of the way, and it has the further disadvantage of scarcity of feeding grounds for stock.

My operations in the field were concluded on November 8, when the outfit was stored with the Hudson's Bay company, at Lesser Slave lake. Two teams and wagons were engaged to take the party and baggage to Edmonton, going by the north shore of the lake and by the new road to Athabaska Landing, where we arrived on the 21st. The ferry had been taken out of the river to avoid the running ice, so we had to have a York boat put in to cross the teams and wagons. A few days later we arrived in Edmonton, where the party was paid off. I then left for Toronto, where I arrived on December 4.

From the foregoing remarks it will be noted that the country surveyed under your instructions is all suitable for present occupation by the farmer and stockraiser. The settlers will find very little difficulty in reaching any part of it, and the climatic conditions are such that mixed farming can be profitably engaged in provided the seed is grown in the country and is planted as early as it is possible to get it in the ground. The past season was very cold, a great deal of rain fell, and frosty nights occurred every month; still, very little damage to crops was spoken of. The only farmer who had threshed before I left the lake told me his oats weighed 44 pounds to the bushel, and seven acres yielded 600 bushels, and the potatoes on less than an acre returned over \$200.

Drift coal is found in many places on the lake shore and in the main streams, indicating the presence of seams underlying the district, but the quality can scarcely be judged from samples seen.

Rolling stone is found in township 75, range 14, but no rock in place, such as would make a quarry. Many intending settlers have visited the country, some locating and others going out, intending to return when the facilities for getting in are improved, and with the prospect of a railway to carry their produce to market. I met two settlers, who have located at Swan river who told me there were eleven in their party ready to locate now and that in the spring as many more would come to take up land.

The scarcity of game within the territory in which my surveys were made is no doubt caused by the constant movement of the Indians and half-breeds who, with their horses and cattle, are moving about for food, and if a moose or deer happens to stray into the vicinity, it is at once hunted down. Lesser Slave lake whitefish make excellent food. Two years ago they were shipped to the Atlantic coast for the hotel trade and because of their good quality they were called Lake Superior whitefish. Indians catch tons of them for their own use and for dog food in the winter. This was more

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particularly so the past year as the rabbit, the Indian's daily food, is practically extinct. Ducks and geese are plentiful on the lake in the late fall, but there are no feeding grounds about the lake so that only a few remain through the summer.

I have the honour to be, sir,

Your obedient servant,

HENRY W. SELBY, *D.L.S.*

APPENDIX No. 39.

REPORT OF C. C. SMITH, D.L.S.

SURVEYS IN SOUTHWESTERN ALBERTA.

BRAMPTON, ONT., March 9, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following report on the surveys performed by me during the past season in southwestern Alberta.

In accordance with your instructions, I proceeded, on May 1, to Moosejaw, where C. F. Miles, D.L.S., was to deliver over to me the survey outfit used the previous season by Mr. Warren. My outfit arrived in Moosejaw on May 6, and the following day I loaded a car and started to Macleod. On May 10 I arrived in Macleod and proceeded to engage men and complete my outfit. I found very great difficulty in getting good men. However I got a sufficient number of men to begin work with and started on May 13, for township 10, range 29, west of the fourth meridian.

The trail from Macleod to Porcupine hills passes through a splendid ranching country, but along all the coulees were scattered the cattle which had perished during the winter and spring. It was a severe blow to the old method of ranching. The inrush of settlers and the consequent fencing of the ranges is fast driving the ranchers from the prairies. The ranges are becoming small. Twenty years ago, so I was told by the manager of the Walrond, cattle ranged from the Gap in the Livingstone mountains to Macleod, a distance of fifty miles; now they are confined to the land owned by the New Walrond company around Callum creek and Oldman river. The country will in a few years, probably raise more cattle on the farms than were raised on the large ranches, for the cowboy romance and the great spring and fall roundups of the oldtime ranchers, are fast being replaced by the more prosaic but more economical methods of the farmers. In August when I came back over this trail I was astonished at the rapidity of the transformation; many houses had been built, and in many places I had to leave the trail where a wire fence cut it off and follow the fence to the proper road allowance.

Having camped on Five Mile creek I began the subdivision of township 10, range 29, at the northeast corner of section 3. I found that the meridian through this corner had been run so I proceeded to the survey of the remainder of the township. The old surveys in many of the townships in this hilly country seem to be rather irregular. This is due I think to the fact that the surveyors tried to chain accurately by breaking chain. In a very hilly country this is impossible for the ordinary chainman. While at the Crowsnest I lost my clinometer, and while awaiting another, chainmen chained three miles with the utmost care, using a short chain. When my clinometer arrived I chained the three miles (which I had not yet mounded) and found half miles chained with the short chain to be short from 10 to 40 links.

Porcupine hills, an exceedingly rough range, run through the southwesterly part of township 10, range 29. The northerly and easterly parts of the township are well adapted to farming and ranching. Almost every quarter section is well watered by fine spring creeks. The valleys have a fine fertile soil, and grain, roots and vegetables grow and ripen well.

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On June 17, I finished the subdivision of township 10, range 29, and moved over a very rough trail into township 9, range 30. The southerly part of this township is covered by an Indian reserve. I ran the meridians south from the north boundary of the township and ran a random line along the north boundary of the reserve to locate, if possible, the monuments placed in the survey of that boundary. Some of these monuments I could not find and some I found were so far from the places shown in the notes of the survey that I decided to defer the completion of the subdivision until I got further instructions from you.

While at these surveys and at subsequent surveys, I investigated the necessity of subdividing the remaining portions of townships 10 and 11, range 1, west of the fifth meridian. These portions are in Porcupine hills, are generally heavily wooded and at that time there was no urgent necessity for immediate survey of all the remaining portions. However, there are some good coulées running into the hills, and it would seem well to complete the subdivision of the townships when the quarters affected by these coulees are being surveyed. Many excellent homesteads in this district await suitable settlers. There is much good building timber in Porcupine hills, springs of beautiful water are plentiful, the valleys have a deep rich loam that is easily worked and the good creeks in the valleys would furnish easy and inexpensive means of irrigation if that were necessary or desirable. It is very necessary, however, that the government should take some means of preserving the timber.

My next work was in township 10, range 2, west of the fifth meridian. The rougher parts of this township had been left and it was these that I was completing. However, most of it was good grazing and farming land.

Much of township 11, range 2, is cut by very high hills, but along the coulées there is some land well adapted to farming and grazing.

On July 16 I began the survey of the south boundary of township 11, range 3. This line afforded sufficient difficulties to satisfy a surveyor for a whole season. The line crossed Oldman river five times within three miles. The velocity of the current, swollen by the late spring thaw and by summer rains, was such as to prevent our crossing otherwise than by horses.

At the Gap, the south boundary of this township crosses the Livingstone mountains, where it is impossible to climb so we had to run a traverse along the foot of the cliff forming the side of the Gap. On joining the traverse to the southeast boundary of section 6, I found a considerable discrepancy between my distance and the theoretic distance, so in re-running the line I made another traverse through the Gap. This confirmed my previous measurements. While at these surveys we saw a number of seams of good coal. No doubt a railway will soon be constructed to this place, and the country will become very productive. Frequent showers were the only phase of the climate that was at all disagreeable, and these happened almost daily.

At your suggestion I arranged to proceed to the surveys at Crowsnest before the season was too far advanced. We found a good wagon road along the valley of the middle fork through Frank, Blairmore and Coleman as far as the easterly end of Crowsnest lake. From here we had to take an old construction road, which many told us was impassable, to the westerly end of the lake. In townships 7 and 8, ranges 5 and 6, we were engaged in subdivision work, and in running a connecting traverse to the Crowsnest coal area. My experience in the Gap had confirmed my opinion that wherever a man can possibly climb it saves time and is more satisfactory to run the line straight than to traverse; hence, except the east boundary of section 6, township 8, range 5, I ran all the lines straight over the mountains, though it necessitated some very difficult work. In connection with this subdivision, it was necessary to traverse the height of land forming the boundary between British Columbia and Alberta. This was an easy matter where the watershed was narrow and well defined as was generally the case. In one place we found a spring forming a pool from which a stream flowed from the western side down to Michel creek and on to the Pacific, while another little stream flowed from the easterly side down to Crowsnest lake and thence on to the

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Arctic. But in many places the watershed develops into heavily wooded plateaus. In the northerly part of township 8, range 6, there was a basin-shaped area at the watershed. To determine the position of the watershed we had to run many lines of levels. There seems to be a necessity for having the boundary permanently marked. This boundary had evidently been traversed before, and while, so far as I can tell, my traverse agreed with the previous one as to the position of the watershed, there were apparently some small differences and it would be impossible in many places for a settler or prospector to tell upon which side of the boundary he was.

While engaged at this work we had a three days' snowstorm which delayed work somewhat. The snow melted off the trees very slowly and for several days we were drenched to the skin from morning until night with ice cold water. However, afterwards we had ideal weather.

On receiving your telegram instructing me to proceed to the survey of Grassy Lake townsite, I loaded the outfit on a car at Crowsnest and arrived at Grassy Lake on October 19. Grassy Lake is most inappropriately named as there is no lake within miles and at the time we were there very little grass was to be seen. There is, however, plenty of good farming land around, settled for the most part by industrious and progressive Americans from Utah, and there is coal in abundance, so that Grassy Lake seems destined to become a good town. To the north of the Canadian Pacific right-of-way, Messrs. Cherry and Driggs had already opened a large store and were engaged in mining operations. On receipt of your instructions I proceeded to investigate and correct an error in the position of a quarter section post in township 10, range 22, west of the fourth meridian.

The season being now too far advanced to permit my returning to the mountains to complete the work there I arranged for wintering the horses and storing the outfit and paid off my party in Lethbridge.

I have the honour to be, sir,

Your obedient servant,

C. C. SMITH, *D.L.S.*

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APPENDIX No. 40.

REPORT OF A. G. STACEY, D.L.S.

SURVEYS IN THE RAILWAY BELT, KAMLOOPS DISTRICT, BRITISH COLUMBIA.

LITTLE BRITAIN, ONT., March 10, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—I have the honour to submit the following general report on my survey operations in the Kamloops district, British Columbia, during the season of 1907.

On April 26, I left Ottawa for Kamloops, British Columbia, where I met Mr. J. E. Ross, D.L.S., with whom I arranged a division of the work lying within the Kamloops district. It was decided that Mr. Ross would undertake the surveys to the east of Kamloops, while I devoted my attention to those townships lying to the west of the city. A week was spent at Kamloops in organizing the party and outfitting for the season's operations. In this task I was most generously assisted by Mr. Ross, who had had considerable experience in the work, and was thoroughly acquainted with local conditions. It was considered advisable not to purchase any transport outfit, but to hire such services as they were required.

On May 13, we left Kamloops, a party of seven, for our first camp on the left bank of Thompson river in township 20, range 18, west of the sixth meridian. Selecting what appeared to be a desirable location, we pitched camp on what afterwards proved to be an island separated from the mainland during high water by a narrow channel which, at that time, was perfectly dry. The water rose so rapidly that in four days' time we were forced to wade the channel through two feet of water and transfer our camp outfit to higher and safer quarters. The work in this township consisted, for the most part, in attempting to locate the boundaries of old provincial lots, and to connect them with the section lines of the Dominion lands system. The results of such work are likely to prove unsatisfactory both to the department and to the surveyor in charge. Where the corners of lots were originally marked with wooden posts and stone monuments they can usually be located with little difficulty; but where the positions were defined only by wooden posts driven a few inches into the ground, it is often impossible to locate the original corners. This is particularly true in the case of lot corners situated within or near the right-of-way of the Canadian Pacific railway. The company seems to have exercised no care whatever in the preservation of survey marks, almost every monument placed in the immediate vicinity of its premises being utterly destroyed, either during the construction days or by fires kindled by the company's employees at various times since then. A most thorough search for the different corners of the various lots mentioned in the instructions was made, and while in several cases the search proved futile, I believe a sufficient number of points have been located to enable the draughtsman to place the lots in their correct positions with reference to the section lines. In any event, the best information that can be gained by a careful survey of the ground has been obtained.

Some of the old section line surveys in the southern part of the township seem to have been very carelessly performed. More retracing of lines affecting the closing of blocks in which we worked could have been made to advantage, though it is diffi-

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cult to estimate where this retracement would cease if satisfactory results are to be obtained. Owing to the number and urgency of other surveys demanding attention, I decided to leave further retracements for some later date. The work being located near Kamloops can easily be attended to by Mr. Ross at his convenience.

Quartersection monuments were found on the east boundaries of sections 8 and 9, though the department seems to have no record of such. These may have been located from a traverse of the boundaries of lot 443. They were left undisturbed, the lines joining them with the section corners to the south being retraced in both cases.

We were fortunate in securing the use of a small gasoline launch for crossing and re-crossing the river while at work on the north side.

On the forenoon of May 30 the party, with the addition of another member, moved by launch to Savonas, a small town at the mouth of Kamloops lake. From Savonas a good wagon road leads southward up Threemile creek valley to the divide between Thompson and Nicola rivers, thence, following Guichon creek, leads into Nicola valley. A thirteen mile drive up this road brought us to the crossing of Threemile creek, where we encamped for subdivision work in township 19, range 21. In this township some heavy timber was encountered, especially in the eastern tier of sections, where the progress of the work suffered for want of additional axemen. I endeavoured, my mail, to secure temporarily the services of two more men, but the effort was unavailing. In consequence, the survey of 26 miles of section lines and four miles of traverse kept us employed continuously from May 31 to July 17. The elevation here is about 4,000 feet above sea level; the nights were invariably cool, and the not too excessive heat of the day was relieved by frequent thunderstorms. The location is, in many respects, ideal for the prosecution of survey work during mid-summer months.

From this plateau we moved to the southern shore of Kamloops lake about three miles west of Cherry Creek station in township 20, range 20. After running a few miles of section lines and locating such corners of lots 407 and 417 as could be found, we proceeded to make certain check and triangulation surveys in the vicinity of Kamloops lake, in accordance with instructions under date of June 3, 1907. The disagreement between the surveys on the opposite shores of the lake was pretty thoroughly checked by means of five distinct triangulations and a number of connecting traverses joining together the different surveys made along the northern shore. Through these ranges telegraph poles were used almost exclusively as reference marks for Canadian Pacific traverse stations, and as the original poles have long since been replaced by new ones the stations are lost. Finding it impossible to tie the surveys to Canadian Pacific traverse stations, connection was made with section and quarter section monuments near the railway, many of which were doubtless established directly from Canadian Pacific traverse stations. Near the township line between ranges 20 and 21 a pine tree used as a reference mark, for a Canadian Pacific traverse station, was noted and the survey tied thereto.

The results of this work indicate that throughout range 19 and the eastern half of range 20 the monuments on the north side of the lake are approximately 3 chains too far south, while those in the western half of range 20 are approximately 6 chains too far north. An error was found in the position of the monument marking the northeast corner of section 27 in township 20, range 19. It is 1.71 chains too far north to agree with the positions of the monuments immediately to the west and was found by Mr. Ross to be about 2.50 chains too far north to correspond with the positions of the monuments to the east. Another error was located in retracing the survey lines about the southeast quarter of section 14 in township 21, range 21. The west boundary of this quarter section was found to be one chain short and the north boundary 2.73 chains short of the theoretical lengths. These errors were corrected, new monuments erected and section lines run connecting this survey with that in range

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20. With the exception of these errors, the old survey lines on the northern shore of the lake would seem, from the retracement, to have been surveyed with unusual accuracy both as to alignment and measurement. Unfortunately the opposite seems to have been the case with many of the early surveys made along the southern shore.

For this work we hired the use of a fairly good skiff, which proved a great convenience in travelling to and from camp while working along the northern shore, where the surface of the country is extremely rough. For crossing the lake a boat of some kind was a necessity. Though we shifted camp no less than three times we were frequently obliged to work at considerable distance from headquarters, entailing much loss of time and energy. This, however, seemed unavoidable owing to the scattered and irregular nature of the surveys. The members of the party seemed less concerned with the hardships and inconvenience of the situation than with the danger constantly occasioned by the presence of the deadly rattlesnake. Fortunately none of the party were bitten though a number of these reptiles were encountered.

In making the survey of section 36, township 20, range 22 a quarter section monument of which the department had apparently no record, was discovered on the east boundary of section 35. It was presumably established from the Canadian Pacific traverse survey. The monument was renewed and the section line extended therefrom. The old witness monument on the east boundary of section 36 being lost, a new one was erected.

On August 27 we made our first move by rail, from Savonas to Semlin, a railway siding in township 21, range 23. There being no trail on the south side of the river it was impossible to secure a conveyance for transferring the outfit and supplies to the nearest camping ground on the bank of the river about one-third of a mile distant. It was therefore necessary to resort to the laborious process of packing the entire outfit on our backs; an interesting experience repeated some eleven days later when again breaking camp. In this township an old witness post and cairn were found near the northeast corner of section 11 on the left bank of Thompson river. The post had no distance marked on it. As this corner was also witnessed by a monument on the right bank of the river it seemed a case of duplicate marking for the same corner. Some subdivision surveys having been made on the north side I decided to destroy the witness monument placed on the south side and leave the corner as located from the north in agreement with these surveys. There is no crossing of the river in this vicinity, so a member of the party was sent around by way of Ashcroft to locate this witness monument, but failed to find any trace of it. The corner was consequently re-established from the witness monument marking the quarter section corner on the east boundary of section 14. Upon producing southward the section line thus defined another monument was found for the quarter section corner on the east boundary of section 11. This I also destroyed and erected a new one in agreement with the monuments established on the section line farther north. The northeast corner of section 6 was also re-established from the north, the original monument having been destroyed. A wooden post and stone mound was found marking the northeast corner of township 20, range 24. Though its position does not agree with the surveys in township 21, range 23, the monument was left undisturbed, and the line joining it to the quarter section monument to the north was retraced. The lands affected by this disagreement are not very valuable and hence there is no urgent need for readjustment.

From the various cases cited above, it would seem that a considerable number of section and quarter section corners, convenient to the railway, were established some years ago, probably from Canadian Pacific traverse stations, but that no record of such monuments was furnished the department. When in the extension of the subdivision surveys, these unrecorded monuments are met with, the surveyor must either recognize them and leave all the discrepancies of the survey in the closing or destroy the monuments and erect new ones in accordance with his own survey. The surveyor must, in each case, after carefully considering local conditions, depend upon his own judgment

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in deciding which course he is to pursue. Complications are apt to arise in the case of witness monuments for corners falling within the bed of the river, as the surveyor making the subdivision on the north side of the river is not likely to discover witness monuments placed on the south side, and hence duplicate markings result.

After travelling by train to Ashcroft and making the surveys required in township 20, range 24, we moved to township 29, range 23, and made sufficient subdivision surveys to cover all the desirable land in that township. The road leading from Ashcroft to this plateau is very winding with an exceedingly heavy grade. Despite the fact that the roadbed was hard and smooth, four good horses found difficulty in hauling up the outfit, the outfit weighing probably less than a ton.

On September 26 we moved into Ashcroft, purchased additional supplies and the same day drove seventeen miles up the Cariboo trail to the correction line between townships 22 and 23, in range 25. In performing the surveys required in these townships, we were careful to connect with the corners of all lots and surveyed mineral claims affecting the lands being surveyed. It is possible that in one or two cases connecting traverses were made which were not absolutely necessary, but in the absence of positive information that such work had previously been performed by another surveyor, it was deemed advisable to make the connections. In most cases, where section lines intersected the boundaries of lots and surveyed mining locations, monuments were placed at the intersections. The work in township 23 brought us within one mile of the limit of the railway belt. We produced the section line another mile and placed a monument on the limit which is not surveyed through this township.

The work in township 22, range 26, was attended to next. While camped there three of the party made a flying camp to township 20, range 26, up the Hat creek road and connected lot 1072 with the Dominion lands system. In order to furnish the agent of Dominion lands with some additional information concerning this lot, I retraced all the boundaries thereof and made complete topographical notes of the adjacent lands and improvements.

On October 31 we moved by wagon into Ashcroft and secured transportation to Spence bridge on the first local freight passing southward. The same evening we moved across the river and some three miles up country, where we were generously accorded the use of a vacant house while working in township 17, range 25.

The branch line of the Canadian Pacific railway up the Nicola valley afforded easy means of transportation to township 15, range 23. The wooden post placed at the southeast corner of lot 566 in this township has been washed away by Nicola river, which at that point has encroached considerably upon the lands situated on the right bank. Connection was made with bearing trees at the northeast corner of this lot, with other lots previously connected with lot 566 and with the northeast corner of the Lower Nicola Indian reserve, number 10.

In order to reach the Skuhun creek valley we ran east across the north boundary of section 10, thence due north three miles over the divide between Nicola river and Skuhun creek valleys. At this point the divide reaches an altitude of 2,500 feet above Nicola river and the ascent from either valley is steep and difficult, though fortunately no inaccessible barriers were encountered. A squatter in section 26 has constructed a wagon road from the mouth of Skuhun creek to within two miles of his cabin. By travelling down the Nicola valley to the Indian village at the mouth of the creek and following this newly constructed road up the valley, the outfit was brought by wagon to our new camping ground in section 27. In this valley section lines were run west as far as the Indian reserve and north and east to the limit of the railway belt effecting a closing at the northeast corner of section 1, in township 16, range 22. For the completion of this work one more camp shift was necessary, and for the first time during the season's operations pack-horses were employed. It was intended, while in this valley, to extend the surveys so as to include some meadows lying approximately in sections 34 and 35, township 15, range 22, but owing to the scarcity of provisions in stock, the severity of the weather, the depth of the snow and the difficulty experienced

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in securing pack-horses under such unfavourable conditions, we were unable to do so. The elevation here is about 7,000 feet, above sea level, the snow was already fifteen inches deep and the weather decidedly cold. In the entire valley there are but two settlers located, neither of whom has made improvements of much value. It would seem, therefore, that further surveys are not particularly urgent, especially as the land best suited for settlement lies six miles beyond the upper termination of the wagon road, the only means of access being an Indian pack trail. From the section lines established subdivision lines can be projected as required to meet future demands.

On December 19, an Indian packing outfit brought the party down the Skuhun Creek valley to Clapperton, a station on the Nicola branch of the Canadian Pacific railway where we boarded the local train for Spence Bridge the same evening. Here the party was discharged with the exception of the assistant who accompanied me to Lytton on the following day, where I met the agent of Dominion lands and discussed with him the surveys to be made at that point. The work in Lytton was completed on the evening of December 25. The next morning we reached Kamloops, where the assistant was released, the outfit stored and all necessary arrangements completed for the closing of the season's field operations.

In the performance of the season's work every reasonable precaution to secure accuracy was observed. The alignment was checked by frequent astronomical observations and the measurements carefully rechecked except in a few cases of closed surveys where no further check was considered necessary. In the early part of the season solar observations were used exclusively. During the long days in June satisfactory stellar observations, with a glass diaphragm, could not be obtained until late in the afternoon, and as camp was usually some miles distant the solar observations were more convenient. During the latter part of the season observations were made on polaris. A sidereal watch, corrected by observing the transit of time stars, was used for noting the time. As a rule, at least two observations were taken at each observation station to guard against possible errors in recording vernier readings. The measurements were made with a five-chain steel tape and a clinometer.

The surveys were scattered and irregular, constantly necessitating the starting of new lines. Old surveys had to be connected or retraced, doubtful monuments investigated, fresh obstacles due to the mountainous character of the country almost daily surmounted, in all of which the closest personal supervision of the surveyor was required. The valley lands, being the most valuable, were surveyed many years ago and the lines gradually extended up the hillsides, with the result that the surveyor has now to climb to an elevation varying from 500 to 2,000 feet above the camp in the valley in order to reach the lines he is projecting. The devotee of the strenuous life need seek no more congenial field than that enjoyed by the surveyor in charge of a party performing miscellaneous surveys in the Kamloops district.

All necessary supplies can be secured at any of the small towns along the railway, though the cost of provisions and camp equipage is much greater here than at either Vancouver or Winnipeg. This financial disadvantage to the surveyor is, to a certain extent, compensated for in the enjoyment of a fairly good mail service and other conveniences consequent upon the proximity of the railway, so often denied other members of the fraternity in the pursuit of their profession.

The city of Kamloops with a population of about 2,500 is the most important centre in this district. It is a progressive little city operating its own water works and electric lighting systems. As a divisional point of the Canadian Pacific railway and a distributing centre for the north Thompson valley and the ranching country to the south it is the scene of considerable commercial activity. A court house, provincial asylum and hospital are located here. Ashcroft, a town of five hundred inhabitants, is the gateway of the Cariboo country to the north. From here great freight wagons drawn by eight and ten-horse teams and laden with tons of supplies leave for

their tedious journey of two hundred and fifty miles into the interior. A splendid stage service with headquarters at Ashcroft forwards the mail and provides accommodation for the travelling public. This busy little town is supported partly by the forwarding industry, though there is also a considerable local trade. Savonas and Spence Bridge are small railway towns forming supply stations for sparsely settled ranching districts.

This district boasts of a delightful climate. After traversing nearly one thousand miles of bleak, frozen prairie with scarcely a green blade to give promise of the approaching spring we were ushered through the gate of the Rocky mountains, past the magnificent scenery of the Selkirk range and down the western slope into the smiling valleys of the interior, already richly clothed in nature's verdant garb. Vegetation here is several weeks in advance of that in either Ontario or the prairie provinces. The long summer season is usually very dry and the air clear and invigorating especially in the Thompson river valley, which is becoming a favourite health resort for sufferers from pulmonary trouble. The autumn weather is ideal, warm, bright and cool, cloudless nights following each other with almost monotonous regularity throughout the greater part of the season. The winters are short and cold with a light snowfall in the valleys. Peach orchards, vineyards, &c., rarely suffer from the severity of the climate. Leaving the river valleys and ascending the hills a gradual yet very perceptible change in climate is experienced. As the elevation increases, the temperature lowers, summer frosts become frequent, rendering the cultivation of vegetables and cereals impossible, the precipitation increases and the winters lengthen.

In the valleys of the Thompson river and of its larger tributaries, Bonaparte and Nicola rivers, the country is largely prairie dotted with small scattered pine and fir. The nutritious bunch grass, which at one time covered these ranges, furnishing ideal pasturage, has disappeared and in its stead flourishes, in many places, the worthless and unsightly sage brush. The sparse growth of other grasses gives the country a somewhat barren appearance, though herds feeding on these grounds look remarkably well. Where irrigation is employed, the soil proves very productive. Back from the valleys the hills furnish good grazing lands for the summer months. Though there are open patches on some of the plateaus, the country is mostly covered with a forest of bullpine and fir. The former makes very good lumber for ordinary uses. The latter is largely manufactured into square timber, being strong and durable, though it does not produce a good quality of lumber. Many of these forests would be valuable lumbering centres, were it not for the difficulty of getting the logs to some navigable stream. Sawmills are at present in operation at both Kamloops and Savonas, though the lumbering industry has not assumed very large proportions in this district. Some of the plateaus are covered with banksian pine which is of little value, except for fuel. These forests support a luxuriant growth of grass and are usually free from underbrush. The cattle, however, much prefer the shorter grass of the more open patches and resort to the timber pastures only when the other fails or the weather proves too severe in the open. The lakes on these plateaus are almost invariably alkaline, though fresh water of excellent quality is found in almost every stream. Cattle ranching has been, and still is, the chief industry. Such rich bottom lands as could be easily irrigated were secured by early settlers engaged in this industry. These holdings yield two crops of hay during a season, furnishing winter provender for herds which, during the summer months, roam at will over the neighbouring hills.

Another industry of some promise, attracting increasing interest during recent years, is the cultivation of fruits and vegetables. In various places throughout the valley of Thompson river small areas have already been given over to the cultivation of these products, with most gratifying results. The character of the climate, combined with the richness of the soil, when properly irrigated, furnishes a product absolutely unexcelled in quality. Exhibitors from this valley have carried off the highest awards at international exhibitions on both sides of the Atlantic. An excellent home market

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for these products helps to make the industry a very profitable one. The returns from this kind of farming are so great in comparison with the returns being at present realized that the early abandonment of cattle ranching in favour of the cultivation of fruits and vegetables seems inevitable. This would provide accommodation for a much greater population than the valley now supports, and would undoubtedly have the effect of directing more immigration to these parts. Promoters of this industry are already securing possession of some of the most valuable holdings. Meadows in higher altitudes could be utilized by those engaged in cattle ranching, so that this industry need suffer little more than the inconvenience of being driven farther from the railway.

This district is undoubtedly rich in minerals, though the mines have been little developed as yet. Low grade ores predominate. Capital is required both for the working of the mines and the erection of smelters for treating the ores. Copper is the mineral most in evidence.

Good government roads have been constructed through the valleys of the different tributaries of Thompson river. Heavy grades are often unavoidable, but the roadbed is usually solid and kept in good repair. In early summer, many of these highways, following the innumerable windings of the picturesque mountain streams as they noisily tumble from their dizzy sources to the stately river below, through valleys rich in scenic grandeur and heavy with the perfume of wild roses blooming in gorgeous profusion on every hand, are beautiful beyond description.

One of the noticeable features of the Pacific province is the cosmopolitan character of its inhabitants. Chinese, Japanese, Hindoos, native Siwashes, English immigrants and Canadian bred citizens, constitute the chief elements in this confusion of races. Institutions sacredly guarded in eastern Canada receive little consideration from many of these people. The problem of the unassimilative elements is everywhere confronted and has already become the peculiar possession of the western statesmen.

In conclusion I wish to express my appreciation of the splendid services rendered the party by my assistant, Orville Rolfson, B.A.Sc., of Walkerville, Ontario, and by W. G. McElhanney, B.A., of Vancouver, B.C., who served in the capacity of articulated pupil.

I have the honour to be, sir,
Your obedient servant,

A. G. STACEY, *D.L.S.*

APPENDIX No. 41.

REPORT OF W. THIBAudeau, C.E.

INVESTIGATION OF WATER POWER ON WINNIPEG RIVER.

OTTAWA, March 24, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

SIR,—In accordance with your instructions, dated July 29, 1907, re preliminary investigation of the water-powers on Winnipeg river, Manitoba, from lake Winnipeg to the western boundary of Ontario, I have the honour to submit my report thereon, including the first falls of English river in Keewatin and the first rapid on Winnipeg river across the eastern boundary of Manitoba. The extent of watershed, the area drained by this river, and the extent and description of the natural resources tributary thereto, are also included.

DESCRIPTION OF RIVER.

Winnipeg river has its source in the lake of the Woods, Ontario, a distance of about fifty miles along the river from the western boundary of the province of Ontario. The lake has an area of over 1,200 square miles, and is controlled at Kenora by a dam twenty feet high. The river has a drainage basin of 52,050 square miles, of which 21,650 square miles is contributed by English river. Its length is about one hundred and fifty miles and it has a descent of about three hundred and fifteen feet. From its mouth to the east boundary of Manitoba, a distance of about one hundred miles, the descent is two hundred and sixty-four feet or about 2.64 feet per mile. This descent is concentrated at many places, producing a large number of valuable water-powers. From the east boundary of Manitoba, the river flows northwesterly to Lamprey falls, where it turns abruptly in a southeasterly direction to Sturgeon falls. From this point it runs westerly to Whitemouth river, thence northerly to Whitemud falls, and from this last point northwesterly to lake Winnipeg. From Kenora, at the point where the lake of the Woods joins Winnipeg river, to lake Winnipeg, the river flows through a formation of bare granite gneiss of a red colour, well polished by glacial action. The river is practically a succession of inland lakes varying in width from one-third of a mile to one and one-half miles. The average depth is thirty to forty feet. In no place did I find bottom at less than fourteen feet.

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RAINFALL AND RUN-OFF—ANNUAL PRECIPITATION.

Years.	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.
<i>Stations.</i>												
Winnipeg	26.29	17.59	27.19	19.82	18.58	23.90	18.49	23.30	22.53	25.26	22.41	23.76
Port Arthur.....	21.48	24.51	20.14	26.53	27.10	23.95	18.49	23.30	22.53	25.26	22.41	23.76
Kenora.....	.....	.....	.....	.....	.....	.....	18.49	23.30	22.53	25.26	22.41	23.76
Winnipeg river drainage basin..	23.88	21.05	23.68	23.17	22.84	23.92	18.49	23.30	22.53	25.26	22.41	23.76
Precipitation, ft. second.....	47,500	42,000	47,000	45,000	43,400	47,500	36,600	45,100	44,500	49,000	44,300	47,000
Average run off.....	37,500	33,200	37,000	35,500	34,700	37,500	29,000	36,600	35,100	38,700	35,000	37,000

In the wider parts of the river, or lake portions, there are numerous small islands having abundant verdure. The principal growth along the river banks is poplar and spruce, while the same growth is found on the flats. Where the shore is rocky the growth consists of jackpine and some white birch. At Fourmile Portage island is a small grove of white pine. From a few miles above Islington to Lake Winnipeg there are a few oak, elm and white birch. The forest on both sides of the river has an undergrowth of thick hazel and willow underbrush, while the country on both sides as far as Sturgeon Falls is rough; rocky knolls and ridges are numerous, averaging from fifty to one hundred feet high, interspersed with swamps and small lakes. From there to the head of Seven rapids the roughness of the country gives place to a plateau-like country overlaid with yellow loam, which extends to lake Winnipeg.

The water at Winnipeg river is of a clear, dark colour, although it drains a territory a great part of which is muskeg and swamp. The water contains no perceptible vegetable matter in suspension. The clearness of the water, I think, is due to the fact that it passes through so many lakes which operate as settling basins. In very few places are grass and weeds seen growing along the shore, or in the water.

The river in places is well stocked with fish; pike, sturgeon and whitefish abound, and there are some salmon trout. In December tracks of moose, caribou, otter, mink and marten were seen, and in the upper part of the river wolves and foxes were heard.

About six miles down the river from the Ontario boundary, the Hudson's Bay company have a post on the west bank, which they use during a portion of the year for trading purposes.

At Pointe du Bois falls on the west side, the Winnipeg City Power company have cleared a space for a power house site and erected several log buildings for the use of their men. At the head of Pinawa channel, and at the diversion weir, the Winnipeg Street Electric Railway company have large camps.

The first farm seen from the boundary is at the mouth of Whitemouth river on the west side. From there, beginning at a point three or four miles farther down, small farms are scattered along the river on both sides to the south of Lac du Bonnet. Lac du Bonnet station is the Canadian Pacific terminal of the Lac du Bonnet branch; the population of this place is about two hundred, mostly employed cutting cordwood in winter, and in summer working in the brick-yards and sawmills. There is an Anglican and a Roman Catholic church and a public school. At the Grand du Bonnet falls some clearing has been done and a large log building has been erected as a camp.

The next settlement is at the foot of Silver falls and extends on both sides of the river to Fort Alexander at lake Winnipeg; considerable farming is done in this settlement.

FARMING LAND.

From the Ontario boundary to Sturgeon falls farming land is found only in spots and from there to Seven rapids, there is slightly more of it; from there to Lake Winnipeg along the river, the land is fair farming land overlaid with yellow loam.

MINERALS.

About five miles down the river from the Ontario boundary to Pointe du Bois I found in several places white mica with cleavage two or three inches square, but no other mineral. The red granite referred to makes a fine building stone and in many places blocks of large size could be quarried.

MERCHANTABLE TIMBER.

Very little timber was seen. It consists of spruce, balsam and tamarack and is suitable only for pulpwood.

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PULPWOOD.

The drainage basin of Winnipeg river in Manitoba, exclusive of ten miles on both sides of the Canadian Pacific railway right-of-way, and exclusive of the farming lands, has an area of about 1,840 square miles, which, added to the drainage basin of English river, in Keewatin, which joins Winnipeg river east of the boundary and covers an area of 9,500 square miles, forms a total of 11,340 square miles. Assuming about half this area to be covered by rivers, lakes and swamps, the balance 5,670 square miles or 3,628,800 acres is forest, averaging twenty cords to the acre, this equals 72,576,000 cords of pulpwood, which is a conservative estimate. Assuming this to be equal to a supply for twenty years, it would allow a consumption of 3,628,800 cords per year or about 3,000,000 tons of pulp, or 9,615 tons per day, which would require about 500,000 horsepower to convert it into pulp.

Within the area alluded to the proportion of pulpwood from my own observations and information gathered from many sources is about as follows: poplar, 55 per cent spruce; balsam and tamarack, 25 per cent; jackpine and a few white birch, 20 per cent. Poplar is found mostly along the rivers and lakes on the flats. As one goes inland spruce, balsam and tamarack, take the place of poplar. Jackpine is found on rocky ridges. The present size of the timber is a growth of about twenty years.

Outside the pulp area already described, but tributary to Winnipeg and English rivers in Ontario, there are 12,000 to 15,000 square miles of the same kind of wood, existing under the same conditions, and which would average about the same per acre.

To preserve the pulpwood industry it is imperative that stringent regulations should be adopted and enforced prohibiting the cutting of trees under a certain size, say three inches in diameter. The owner of the timber berth should not be allowed to cut over the same area twice in twenty years, except in special cases.

I saw only two places where the timber had been destroyed by fire.

Although the country is rough it would be easy to construct a railway logging road at a reasonable cost. Logging with teams would have to be done in winter owing to the swampy character of a portion of the ground.

WATER-POWER.

By controlling the water-power at Kenora, the minimum efficiency of the water-power of Winnipeg river would be increased from 2,200 horsepower per foot fall to 4,080 horsepower per foot fall.

Lake of the Woods has a storage area of over 1,200 square miles by twenty feet deep or 21,172 foot-seconds the year round, or 2,340 horsepower per foot fall per day the year round. The lake is controlled at Kenora by a dam. The average run-off of Lake of the Woods, Rainy river and lake drainage basin is about 22,000 foot seconds.

The storage of the Lake of the Woods would contain about 70 per cent of the yearly run-off, taking the year 1902 as the lowest for the last eleven years, or nearly double the minimum flow of Winnipeg river, 36,000 foot-seconds, 4,080 horsepower the year around per foot fall. This demonstrates the immense importance of controlling the water at Kenora dam for the future development of the water-powers of Winnipeg river.

THE IMPORTANCE OF WINNIPEG WATER-POWERS COMPARED WITH NIAGARA FALLS.

Winnipeg river has 264 feet descent from the Ontario boundary to lake Winnipeg; with the control dam at Kenora 247 feet descent is available for water-power, yielding 903,300 minimum horsepower which could be utilized, and without the control dam at Kenora, 486,800 minimum horsepower which could be utilized. Compared

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with Niagara falls which has a minimum of 2,600,000 horsepower, of which 80 per cent is on the Canadian side, the water-powers of Winnipeg river would be as follows: with the control dam at Kenora, forty-three per cent of Niagara falls on the Canadian side, and without the control dam twenty-three per cent.

WATER-POWER AND COAL.

A coal consumption per indicated horsepower for condensing engine would be one and one-half pounds per hour as minimum consumption, under test conditions, with the most efficient machinery under favourable conditions. On this basis the consumption of coal per horsepower per day would be thirty-six pounds or six and one-half tons per year. Winnipeg river water-power with the control of Kenora dam is the equivalent of coal consumption of 5,871,450 tons a year which would be required to generate the same power, without the control of the Kenora dam, the water-power would be the equivalent of a coal consumption of 3,564,200 tons a year.

The quantity of coal required to produce power equal to the water-power of Winnipeg river, with and without control of Kenora dam conveys an idea, not only of the value of the water-powers of Winnipeg river, but also the desirability of controlling Kenora dam.

WINNIPEG POWER PLANT.

Upon Winnipeg river at Pointe du Bois falls the City of Winnipeg Power department are about to construct a large power plant. They have cleared a portion of the site and built some workmen's log houses. To assist in the installation of the plant they are building a railway from Lac du Bonnet station to Pointe du Bois. The rails are already laid from the Canadian Pacific railway station to the crossing about two and one-half miles, and that part of the line has been ballasted. From Winnipeg river to Pinawa channel the grading is nearly completed, except for a couple of small rock cuts. From Pinawa channel to Pointe du Bois, about half the clearing, grading and rock cutting has been done. In December they were building crib piers filled with stone for their bridge over Winnipeg river.

PINAWA CHANNEL.

The Winnipeg Street Railway and Power company have accomplished a large amount of rock cutting from the head of Pinawa channel for a distance of about four miles, their diversion weir raised the water about six feet. On the north channel the weir is a crib dam and on the south channel a loose rock dam. The spillway and control dam are substantially constructed of cement masonry. The generating station (20,000 H.P.) has a foundation of cement masonry, the upper part being of brick. It is solidly built and is of a permanent character. The dam is also a solid structure of cement masonry. Half a dozen good brick houses, each with stone foundations, have been built. All the stone used is pink coloured granite, and was quarried in the vicinity, while the brick was obtained from the Lac du Bonnet brickyard.

At the Winnipeg City Power tramway crossing, there have been two big rock cuts to improve the channel to dispose of the tail-race water. The trouble with tail-race arises, I think, in consequence of the channel being of rock and not overlaid so deep with sediment as expected.

It was contemplated at first that the great quantity of water passing out would scour the channel, but for the reasons given this was not the case. The dam has since been raised 30 inches with square timber, and this should greatly facilitate the passing off of the tail-race water. The quantity of water passing through Pinawa channel at the power house at the different times I have been there was about 7,500 to 8,000 foot-

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seconds, which is about equal to twenty-seven per cent of the minimum flow of Winnipeg river.

The transmission line from the power plant at Winnipeg is carried on steel towers of first class workmanship.

WATER-POWER OF FALLS.

The first fall on English river has a descent of 8.74 feet. The minimum flow is estimated at 8,310 foot-seconds or 1,012 horsepower per foot fall. It is practical to build a dam ten to twelve feet high. I do not know whether it would flood the Indian reserve on Loneman lake. Minimum horsepower, 8,845.

The first fall or rapids on Winnipeg river is about two and one-half miles east of the boundary of Manitoba. It has a 4.04 foot descent and is of no commercial importance. A dam built eight to ten feet high would flood the best grazing and hay land of Islington Indian reserve. The river is divided in three channels, one of them would have to be dammed about three miles from the main channel. Minimum flow estimated at 19,400 feet per second; minimum horsepower, 8,888

LAMPREY FALLS.

This falls is situated on section 24, township 16, range 15, east of principal meridian. It has a descent of 14.26 feet. The water could not be raised higher than six feet without flooding the Islington Indian reserve. The length of dam is 1,350 feet on rock bottom abutment. Minimum horsepower, 31,372.

POINTE DU BOIS FALLS.

This falls situated on section 36. township 15, range 14, has a descent of 31.63 feet. A dam could not be built without destroying a part of Lamprey falls. I would suggest building a dam to raise the water 23.28 feet. This would obliterate Lamprey and Boundary falls. Minimum horsepower, 69,586.

EIGHT-FOOT FALLS.

This falls situated on section 25, township 15, range 14 and section 30, township 15, range 15, has a descent of 8.30 feet. Minimum horsepower, 18,260. The water could not be raised without interfering with Pointe du Bois falls. As is stands it could be utilized cheaply.

SLAVE FALLS.

Slave falls is situated on sections 1, 2, 11 and 12 township 15, range 14. It has a descent of 17.39 feet, minimum horsepower 40,018. In building a dam the water could be easily diverted on the west side where there is a fine millsite.

STURGEON FALLS.

Sturgeon falls is situated on section 8, township 14, range 4. It has a descent of 4.35 feet, minimum horsepower 9,570. The water could not be raised without interfering with Slave fall.

OTTER FALL.

This fall situated on section 7, township 14, range 13, has a descent of 1.10 feet, minimum horsepower, 2,420. This fall used to be five or six feet high, but has been reduced to the present height owing to the diversion weir built below Pinawa channel.

DIVERSION WEIR.

The diversion weir is situated below Pinawa channel has a descent of 6.10 feet. It is built in two channels, on the north channel cribwork, on the south channel loose rock work, of no commercial value to generate power.

UPPER SEVEN RAPIDS FALLS.

This fall is situated on section 36, township 13, range 11 and section 31, township 13, range 12 at the bay, descent 23.13 feet; minimum horsepower 50,886. It is practicable to build a dam to divert the water on the east side, where on the bay there is an ideal millsite.

NO. 1 MCARTHUR FALL.

No. 1 McArthur fall is situated at the outlet of Lac du Bonnet, on sections 27 and 35, township 16, range 11. It has a descent of 6.95 feet minimum horsepower, 15,812.

NO. 2 MCARTHUR FALL.

No. 2 McArthur fall is situated on sections 34 and 35 township 16, range 11. It has a descent of 6.81 feet, minimum horsepower, 14,982. On the two channels it is practicable to build dams to raise the water to the ordinary level of Lac du Bonnet.

GRAND DU BONNET FALLS.

This fall situated on sections 14, 15 and 22 township 17, range 11 has a descent of 34.09 feet, minimum horsepower 74998. It is practicable to build a dam on the two channels about 730 feet long to divert the water on the northwest side where there is a good millsite.

FALL.

This fall situated on section 27, township 17, range 11, has a descent of 8.86 feet, minimum horsepower, 19,492. It is not practicable to raise the water without interfering with Grand du Bonnet fall, but it could be economically used in its present condition.

WHITEMUD FALLS.

Whitemud falls situated on sections 29, 30, 31 and 32, township 17, range 11 has a descent of 12.19 feet, minimum horsepower 26,818. It is practicable to build a dam and divert the water on the east side where there is a good millsite.

SILVER FALLS.

Silver falls is situated on section 1, township 18, range 10. It has a descent of 22.72 feet. Minimum horsepower, 49,984. It is practicable to build a dam to divert water on both sides.

PINE FALL.

This fall, situated on section 29, township 18, range 10, has a descent of 7.79 feet, minimum horsepower 17,138. It is practicable to build a dam and divert the water through the old mill race.

Inasmuch as the water-powers in some cases occur within a short distance of each other, I suggest that the power should be concentrated as much as possible, which can

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be accomplished without any loss of power. The distance between any two water-powers would be navigable for vessels drawing ten feet of water. The horsepower given below is based on an assumed minimum flow of 19,400 feet of water per second.

1. Pointe du Bois falls are situated on section 36, township 15, range 14. A dam should be built to raise the water 23.28 feet. This would give a descent of 54.91 feet, minimum horsepower, 120,802. This dam should be about seven hundred and twenty feet long, and would be intersected by two rocky islands the bottom and abutment would be on solid granite foundation. The water should be diverted on the west side where there is a good millsite. Very little rock excavation would be required but some filling on the east side of the channel might be necessary.

SLAVE FALLS.

2. Slave falls is situated on sections 1, 2, 11 and 12, township 15, range 14. A dam should be built to raise the water 8.19 feet. This would give a descent of 25.58 feet. Minimum horsepower, 56,276. This dam should be about three hundred and fifty feet long. The bottom and abutment would be on bare solid granite foundation. This dam would obliterate the eight foot fall. The water should be diverted on the west side, where there is a good millsite. Little rock excavation would be required on the canal.

UPPER SEVEN RAPIDS FALLS.

3. This falls is situated on section 31, township 13, range 12 and section 36, township 13, range 11. The dam should be built to raise the water 15.57 feet, which would give a descent of 39.40 feet. Minimum horsepower at the bay, 50,039. On the upper and lower Seven Rapids falls the amount of water going through Pinawa channel, or 8,000-foot seconds, has been deducted. This dam should be about four hundred feet long, the bottom and abutment being on bare solid granite formation. This dam would obliterate Otter and Sturgeon falls. The water should be diverted on the southeastern side to the bay where there is an ideal millsite. Little or no rock cutting would be required on the channel.

LOWER SEVEN RAPIDS FALLS.

4. This fall is situated on sections 26, 27, 33, 34 and 35, township 13, range 11; from the head of Second falls below the bay at Upper Seven rapids a dam should be built to raise the water seven feet. This would give a descent of 24.60 feet, minimum horse-power 31,807. This dam should be about 930 feet long and would be intersected by two rocky islands. The bottom and abutment would be on solid bare granite formation. There is a good millsite on the northeastern side, which I think would be the best side to divert the water.

GRAND DU BONNET FALLS

5. Grand du Bonnet falls is situated on sections 14, 15, 22 and 23, township 17, range 11. A dam should be built to raise the water fourteen feet. This would give a descent of 48.09 feet, minimum horsepower, 105,798. The dam would require to be about 795 feet long, and would be intersected by one island. The bottom and abutments would be on solid bare granite. The water should be diverted on the north-westerly side where there is a good millsite. A considerable amount of rock cutting would be required on the channel. This dam would obliterate McArthur 1 and 2 falls and would raise the water to the general level of Lac du Bonnet.

SILVER FALLS.

6. Silver falls is situated on sections 1, 2, 11 and 12, township 18, range 10. A dam should be built to raise the water 20.90 feet. This would give a descent of

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43.62 feet,—minimum horsepower, 95,964. The dam would require to be about 800 feet long and would be intersected by one rocky island. The bottom and abutment would be on solid granite formation. This dam would obliterate Whitemud fall and the fall below Grand du Bonnet falls. The water could be diverted on either side.

PINE FALLS.

7. Pine falls is situated on section 29, township 18, range 10. A dam should be built to raise the water 4.08 feet. This would give a descent of 11.87 feet, minimum horse-power 26,114. This dam would require to be about 860 feet long. The bottom and abutment would be on solid bare granite formation. The water should be diverted on the southern side along the old mill-race, where there is a good mill-site.

FIRST FALL ON ENGLISH RIVER.

8. The first fall on English river is situated about ten miles up from its junction with Winnipeg river. It has a descent of 8.6 feet. It would be safe to raise the water by a dam about 6 feet which would give a descent of 14.6 feet—minimum horsepower, 14,168. This dam would require to be about 530 feet long. The bottom and abutments would be on solid bare granite. The water should be diverted on the west side.

WATER-POWER AT THE FALLS.

I would suggest that the water-powers be concentrated in as few places as possible; this would make it cheaper to develop the power per horsepower. No dam should be built at any of the water-power falls without the sanction of the government. The dams should be water-tight, and so constructed as not to interfere with other water-power; however, water not used at a lower plant, millsite or generating station should be at the disposal of the government as should any portion of millsite not used.

If a large quantity of power were used at any of the proposed water-powers to be developed, it might be found necessary to have some legislation enacted to prevent the owners of the Kenora dam flooding unnecessarily the power people on Winnipeg river, or to reduce for weeks the minimum flow of the river to one-half or less than what it would naturally be, if not interfered with by the unnecessary closing or opening of their dam.

I have measured the flow of English river at 'the Narrows,' about one mile below the first fall and found the depth of water to be from fifty to eighty feet. In determining the velocity at this point, I could not arrive at any satisfactory conclusion without using a current metre. The results obtained were certainly in excess of the correct figures. I have deducted the minimum flow of English river from its drainage basin.

HIGH WATER MARK.

There is a well defined high water mark about five and one-half feet to six and one-half feet above ordinary water. I am informed by old Indians that the water has not reached that height for years past. If the range between high and low water is not more, it is probably due to the greater number of lakes in the Rainy lake and Lake of the Woods district.

I transmit herewith the following plans:—

1. The general plan of the country from Kenora to north of lake Winnipeg and west of the city of Winnipeg, showing general location of water-powers, and location of generating station of Winnipeg City Electric railway, their transmission line, the proposed location of the Winnipeg City Power generating station at Pointe du Bois, their tramway under construction, and their proposed transmission line.

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2. Diagram showing discharge mean velocity and area, cross section, &c., &c. These rating curves were determined by two cross-sections, one made by the Winnipeg City Power company on March 7, 1906, at Pointe du Bois falls, and the other by myself September 12, 1907, about a mile above Lamprey falls, both connected with the gauge height at Pointe du Bois falls. The quantities were deduced by Kutter's formulæ after many trials and compared with the snow and rain fall of the past eleven years.

The great variation shown at the gauge height between April 10 and 20, 1907, are not natural; they are due to the opening or closing of the control dam at Kenora.

Loss by the average yearly run off is about twenty-one per cent.

3. The gauge height for three hundred and twelve days in 1907 was furnished to me by the Winnipeg City Power company, also the cross-section above Pointe du Bois falls. The velocity of the water was taken by a current metre at every four feet in depth, and at distances about twenty feet apart.

4. The profile showing all the bench marks, height of falls, &c.

5. Detailed plans of all the water-powers on a scale of six chains to one inch.

6. Table showing upper and lower gauge reading at Pointe du Bois falls from January 23, 1907, to March 31, 1908.

By means of the diagram and table, the quantity of water and horsepower for every day from January 1, 1907, to March 31, 1908, may be fully ascertained by using the upper gauge reading.

7. Table showing the ground required for millsites.

8. Table of land that might be flooded by proposed millsite, &c.

I have the honour to be, sir,

Your obedient servant,

W. THIBAudeau, C.E.

GAUGE reading at Pointe du Bois Falls, taken by the City of Winnipeg Power Department, January 28, 1907 to March 31, 1908.

Date.	Upper Gauge Reading.	Lower Gauge Reading.	Date.	Upper Gauge Reading.	Lower Gauge Reading.
January 23 ...	0·6	0·5	March 25....	0·5	1·0
24....	....	....	26....	0·4	1·1
25....	....	....	27....	0·4	1·1
26....	0·3	0·6	28....	0·5	1·1
27....	....	....	29....	0·5	0·9
28....	....	....	30....	0·5	....
29....	0·2	0·9	April 1....	0·5	0·9
30....	....	....	2....	0·5	1·0
31....	0·2	1·0	3....	0·6	1·2
February 1....	0·2	0·9	4....	0·6	1·2
2....	0·2	0·7	5....	0·6	1·3
3....	....	....	6....	0·6	1·2
4....	0·1	1·0	7....	0·6	....
5....	0·1	1·1	8....	0·6	1·3
6....	0·1	1·1	9....	0·6	1·3
7....	0·3	1·0	10....	0·7	1·3
8....	0·3	0·8	11....	0·9	1·3
9....	0·3	0·3	12....	1·1	1·3
10....	0·3	....	13....	1·3	1·3
11....	0·3	0·3	14....	1·2	....
12....	0·3	0·2	15....	1·1	1·3
13....	0·3	0·3	16....	0·9	1·3
14....	0·3	0·0	17....	0·8	1·3
15....	0·3	0·5	18....	0·7	1·3
16....	0·3	0·5	19....	0·7	1·3
17....	0·4	....	20....	0·6	1·3
18....	0·4	0·6	21....	0·6	....
19....	0·4	0·4	22....	0·6	1·3
20....	0·4	0·4	23....	0·6	1·3
21....	0·4	0·3	24....	0·7	1·3
22....	0·4	0·5	25....	0·7	1·2
23....	0·4	0·5	26....	0·7	1·3
24....	....	....	27....	0·6	1·3
25....	0·4	0·3	28....	0·6	....
26....	0·4	0·1	29....	0·6	1·3
27....	0·5	0·1	30....	0·6	1·3
28....	0·5	0·3	May 1....	0·6	1·3
March 1....	0·5	0·5	3....	0·6	1·2
2....	0·4	0·5	3....	0·6	1·2
3....	0·4	....	4....	0·6	1·3
4....	0·4	0·7	5....	0·6	....
5....	0·4	0·6	6....	0·6	1·2
6....	0·4	0·5	7....	0·6	1·2
7....	0·4	0·6	8....	0·6	1·1
8....	0·4	0·6	9....	0·6	1·1
9....	0·4	0·7	10....	0·6	1·2
10....	0·4	....	11....	0·5	1·2
11....	0·4	0·9	12....	0·5	....
12....	0·4	0·8	13....	0·5	1·2
13....	0·5	0·7	14....	0·5	1·2
14....	0·6	0·8	15....	0·5	1·2
15....	0·5	0·7	16....	0·5	1·1
16....	0·5	0·8	17....	0·4	1·1
17....	0·5	....	18....	0·4	1·0
18....	0·6	0·8	19....	0·4	....
19....	0·6	0·8	20....	0·4	0·9
20....	0·6	0·8	21....	0·4	0·8
21....	0·6	0·9	22....	0·4	0·8
22....	0·6	1·0	23....	0·3	0·7
23....	0·5	1·0	24....	0·3	0·7
24....	0·5	25....	0·3	0·7

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GAUGE reading at Pointe du Bois Falls—*Continued.*

Date.		Upper Gauge Reading.	Lower Gauge Reading.	Date.		Upper Gauge Reading.	Lower Gauge Reading.
May	26....	0.2	0.7	August	3 ...	1.4	1.4
	27....	0.2	0.6		4...	1.4	1.4
	28....	0.1	0.5		5....	1.4	1.5
	29....	0.1	0.4		6 ...	1.4	1.3
	30....	0.0	0.3		7....	1.4	1.3
	31....	0.1	0.3		8....	1.4	1.3
June	1....	0.1	0.3		9....	1.3	1.3
	2....	0.2	0.2		10 ...	1.4	1.3
	3....	0.3	0.1		11....	1.4	1.3
	4....	0.4	0.0		12....	1.4	1.3
	5....	0.4	0.1		13 ..	1.4	1.3
	6....	0.5	0.2		14....	1.4	1.3
	7....	0.5	0.3		15....	1.4	1.3
	8....	0.5	0.3		16....	1.4	1.3
	9....	0.5	0.3		17....	1.4	1.3
	10 ...	0.6	0.4		18....	1.5	1.3
	11....	0.8	0.6		19....	1.6	1.5
	12....	0.9	0.8		20....	1.6	1.6
	13....	1.0	0.9		21....	1.7	1.6
	14....	1.0	0.9		22....	1.7	1.7
	15....	1.1	1.0		23....	1.7	1.7
	16....	1.1	1.1		24....	1.7	1.7
	17....	1.2	1.1		25....	1.7	1.7
	18....	1.3	1.2		26....	1.9	1.7
	19 ...	1.3	1.3		27...	1.9	2.0
	20....	1.3	1.3		28....	1.9	2.0
	21....	1.4	1.4		29....	1.9	2.0
	22....	1.5	1.5		30....	2.0	2.0
	23....	1.5	1.6		31....	2.0	2.0
	24....	1.5	1.6	September	1....	1.9	2.1
	25....	1.5	....		2....	1.9	2.1
	26....	1.5	1.7		3....	2.0	2.2
	27....	1.5	1.8		4....	2.0	2.2
	28....	1.6	1.8		5....	2.0	2.2
	29....	1.6	1.8		6....	2.0	2.2
	30....	1.6	1.8		7....	2.0	2.3
July	1....	1.6	1.9		8....	2.0	2.3
	2....	1.6	1.9		9....	2.0	2.3
	3....	1.6	1.9		10....	2.0	2.3
	4....	1.6	1.9		11....	2.0	2.3
	5....	1.5	1.9		12....	2.0	2.3
	6....	1.5	1.9		13....	2.0	2.3
	7....	1.5	1.9		14....	2.1	2.5
	8....	1.5	1.8		15....	2.1	2.5
	9....	1.5	1.7		16....	2.1	2.5
	10 ...	1.5	1.6		17....	2.1	2.5
	11....	1.5	1.6		18....	2.1	2.5
	12....	1.5	1.6		19....	2.1	2.5
	13....	1.5	1.5		20....	2.1	2.5
	14....	1.5	1.5		21....	2.1	2.5
	15....	1.5	1.5		22....	2.1	2.5
	16....	1.5	1.5		23....	2.2	2.5
	17....	1.5	1.5		24....	2.2	2.5
	18....	1.5	1.5		25....	2.2	2.5
	19....	1.5	1.5		26....	2.2	2.5
	20....	1.5	1.5		27....	2.3	2.7
	21....	1.5	1.5		28....	2.3	2.7
	22 ...	1.5	1.5		29....	2.3	2.7
	23....	1.5	1.5		30....	2.3	2.7
	24....	1.5	1.5	October	1....	2.3	2.8
	25....	1.5	1.5		2....	2.4	2.9
	26....	1.4	1.4		3....	2.4	2.9
	27....	1.4	1.4		4....	2.4	2.9
	28....	1.4	1.4		5 ...	2.5	3.3
	29....	1.4	1.4		6....	2.5	3.3
	30....	1.4	1.4		7....	2.5	3.3
	31....	1.4	1.4		8....	2.5	3.3
August	1....	1.4	1.4		9....	2.5	3.3
	2....	1.4	1.4		10....	2.5	3.3

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GAUGE reading at Pointe du Bois Falls—*Continued.*

Date.	Upper Gauge Reading.	Lower Gauge Reading.	Date.	Upper Gauge Reading.	Lower Gauge Reading.
October 11....	2.6	3.3	December 18....	2.5	2.7
12....	2.7	3.4	19....	2.5	2.7
13....	2.7	3.4	20....	2.5	2.6
14....	2.7	3.4	21....	2.5	2.5
15....	2.7	3.4	22....	2.5	2.5
16....	2.7	3.4	23....	2.5	2.5
17....	2.7	3.4	24....	2.5	2.5
18....	2.7	3.4	25....	2.5	2.5
19....	2.7	3.4	26....	2.5	2.5
20....	2.7	3.4	27....	2.5	2.4
21....	2.7	3.4	28....	2.5	2.3
22....	2.7	3.4	29....	2.5	2.3
23....	2.7	3.4	30....	2.5	2.4
24....	2.7	3.4	31....	2.5	2.3
25....	2.7	3.4	January 1....	2.5	2.3
26....	2.7	3.4	2....	2.4	2.3
27....	2.7	3.4	3....	2.4	2.4
28....	2.7	3.4	4....	2.4	2.3
29....	2.7	3.4	5....	2.4	2.3
30....	2.5	3.3	6....	2.4	2.3
31....	2.5	3.3	7....	2.4	2.4
November 1....	2.5	3.3	8....	2.4	2.4
2....	2.5	3.3	9....	2.4	2.3
3....	2.5	3.3	10....	2.4	2.4
4....	2.5	3.3	11....	2.4	2.3
5....	2.5	3.3	12....	2.3	2.3
6....	2.5	3.3	13....	2.4	2.3
7....	2.5	3.3	14....	2.4	2.3
8....	2.5	3.3	15....	2.4	2.4
9....	2.5	3.3	16....	2.4	2.3
10....	2.5	3.3	17....	2.4	2.3
11....	2.5	3.3	18....	2.5	2.3
12....	2.5	3.3	19....	2.5	2.3
13....	2.5	3.3	20....	2.5	2.3
14....	2.5	3.3	21....	2.5	2.3
15....	2.5	3.3	22....	2.5	2.3
16....	2.5	3.3	23....	2.5	2.3
17....	2.5	3.3	24....	2.5	2.0
18....	2.5	3.3	25....	2.5	2.0
19....	2.5	3.3	26....	2.5	2.1
20....	2.5	3.3	27....	2.5	2.2
21....	2.5	3.3	28....	2.5	2.5
22....	2.5	3.3	29....	2.6	2.7
23....	2.5	3.3	30....	2.6	2.9
24....	2.5	3.3	31....	2.6	2.9
25....	2.5	3.3	February 1....	2.6	2.9
26....	2.5	3.3	2....	2.7	2.0
27....	2.5	3.3	3....	2.7	3.0
28....	2.5	3.3	4....	2.7	2.7
29....	2.5	3.3	5....	2.8	2.9
30....	2.5	3.3	6....	2.8	2.9
December 1....	2.5	3.3	7....	2.8	2.9
2....	2.5	3.3	8....	2.8	3.0
3....	2.5	3.3	9....	2.8	2.8
4....	2.5	3.3	10....	2.8	2.6
5....	2.5	3.3	11....	2.9	2.3
6....	2.5	3.2	12....	2.9	2.2
7....	2.5	3.1	13....	2.9	2.0
8....	2.5	3.1	14....	2.8	2.0
9....	2.5	3.0	15....	2.8	2.0
10....	2.5	3.0	16....	2.8	2.0
11....	2.5	3.0	17....	2.8	2.0
12....	2.5	2.9	18....	2.8	1.9
13....	2.5	2.9	19....	2.8	2.0
14....	2.5	2.8	20....	2.8	1.9
15....	2.5	2.8	21....	2.7	1.9
16....	2.5	2.7	22....	2.8	1.8
17....	2.5	2.7	23....	2.8	1.8

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Gauge reading at Pointe du Bois Falls—Continued.

Date.	Upper Gauge Reading.	Lower Gauge Reading.	Date.	Upper Gauge Reading.	Lower Gauge Reading.
February 24....	2.7	2.3	March 16....	2.8	1.5
25....	2.6	2.5	17....	2.8	1.7
26....	2.6	2.5	18....	2.7	1.5
27....	2.7	2.5	19....	2.7	1.5
28....	2.7	2.5	20....	2.7	1.5
29....	2.7	1.9	21....	2.8	1.4
March 1....	2.7	1.8	22....	2.7	1.5
2....	2.8	1.7	23....	2.8	1.3
3....	2.8	1.7	24....	2.8	1.3
4....	2.8	1.6	25....	2.8	1.3
5....	2.8	1.6	26....	2.7	1.3
6....	2.7	1.6	27....	2.7	1.2
7....	2.7	1.6	28....	2.7	1.2
8..	2.7	1.7	29....	2.7	1.1
9....	2.7	1.8	30....	2.7	1.0
10...	2.7	1.8	31....	2.7	1.0
11....	2.7	1.6			
12....	2.8	1.5			
13...	2.8	1.6			
14....	2.8	1.5			
15...	2.8	1.5			

N.B.

C.P.R. levels.

Upper gauge..... 962.69

Lower gauge..... 930.95

Discharge and Horsepower Table for Winnipeg River, Manitoba—Pointe du Bois, Upper Gauge, 1907-1908.

Upper gauge reading.	Discharge foot-second.	Theoretical Horsepower per foot fall.	Upper gauge reading.	Discharge foot-second.	Theoretical Horsepower per foot fall.
3.00....	72000	8180	0.80.....	33500	3624
2.90.....	69500	7700	0.70.....	32420	3512
2.80.....	67100	7300	0.60....	31300	3386
2.70....	64500	6855	0.50.....	30350	3285
2.60....	62025	6710	0.40.....	29450	3186
2.50....	59600	6448	0.30.....	28450	3078
2.40.....	57350	6205	0.20.....	27500	2976
2.30.....	55250	5978	0.10.....	26550	2880
2.20.....	53200	5791	0.00.....	25600	2770
2.10....	51250	5545	—0.10....	24700	2672
2.00.....	49550	5356	—0.20....	23950	2592
1.90.....	48025	5196	—0.30.....	23123	2500
1.80....	46600	5042	—0.40.....	22300	2413
1.70.....	45150	4886	—0.50.....	21550	2331
1.60.....	43700	4728	—0.60.....	20800	2250
1.50.....	42300	4560	—0.70.....	20050	2169
1.40.....	41000	4435	—0.80.....	19400	2100
1.30.....	39100	4278	—0.90.....	18750	2018
1.20.....	38420	4156	—1.00.....	18100	1978
1.10.....	37150	4020	—1.10.....	17450	1888
1.00.....	36000	3900	—1.20....	16800	1816
0.90.....	34600	3747	—1.30.....	16150	1740

Approximate list of parcels of land that are liable to be flooded if dams are built as suggested. Generally, any land where the water is not to be raised more than twelve feet is not likely to be flooded.

SILVER FALLS TO WHITEMUD FALLS.

Section 1, east half section 2, township 18, range 10 east of the principal meridian, section 36, north half and southeast quarter section 25, and northeast quarter

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section 24, township 17, range 10, southwest quarter section 6, township 18, range 11, north half section 30, section 31 and west half section 32, township 17, range 11.

GRAND DU BONNET FALLS.

Sections 2, 3, 10, 11, 14, 22, east half section 15, southeast quarter and west half section 23, township 17, range 11.

LOWER SEVEN RAPIDS FALLS.

North half section 27, northeast quarter section 28, east half section 33, section 34 and west half section 35, townships 13, range 11.

UPPER SEVEN RAPIDS FALLS.

Sections 31, 32, 35 and 36, northeast quarter section 34, north half section 33, township 13, range 12, south half section 5, sections 1, 2, 3 and 4, south half sections 10 and 11, township 14, range 12.

POINTE DU BOIS FALLS.

East half section 35, section 36, township 15 range 14, west half section 31, township 15, range 15, section 1 east half section 2, south half and northeast quarter section 12, township 16, range 14, northwest quarter section 3, north half and southwest quarter section 4, sections 5, 6, 7, 8, 9, 14, 15, 16 and 23, north half and southwest quarter section 10, north half section 11, east half and southwest quarter section 17, south half sections 21 and 22, township 16, range 15.

LAND RESERVED FOR MILLSITE.

POINTE DU BOIS.

Section 36, township 15, range 14 east of principal meridian.

SLAVE FALLS.

Southeast quarter section 11, southwest quarter section 12, northwest quarter section 1 and northeast quarter section 2, township 15, range 14.

UPPER SEVEN RAPIDS FALLS.

West half section 31, township 13, range 12, section 36 and north half section 25, township 13, range 11.

LOWER SEVEN RAPIDS FALLS.

West half section 35, section 34, north half section 27, east half section 33 and northeast quarter section 28, township 13, range 11.

GRAND DU BONNET FALLS.

Sections 14, 22, 23, north half section 15, township 17, range 11.

SILVER FALLS.

North half section 1, south half section 12, northeast quarter section 2 and southeast quarter section 11, township 18, range 10.

PINE FALLS.

Northwest quarter section 18, west half section 28, north half section 19 and section 29, township 18, range 10.

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APPENDIX No. 42.

REPORT OF J. N. WALLACE, D.L.S.

SURVEY OF THE BOUNDARY BETWEEN BRITISH COLUMBIA AND THE YUKON TERRITORY ACROSS
THE DALTON TRAIL.

CALGARY, ALTA., January 6, 1908.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa, Ont.

Sir,—I have the honour to submit the following report of the survey of part of the boundary between British Columbia and the Yukon Territory, undertaken in accordance with your instructions of May 13, 1907:—

I left Calgary on May 27 and reached Vancouver on the 30th, having stopped over for two days at Kamloops, B.C., where I purchased thirteen pack horses.

The party was organized and the outfit completed at Vancouver. We left there on June 7 by the Canadian Pacific steamer *Princess Beatrice*, and reached Skagway on the evening of June 11.

My instructions were to offset the monuments on the Yukon boundary between lake Bennett and Windy arm, and then to proceed with the survey across the Dalton trail. I, therefore, divided the party at Skagway; the head packer and three men were sent with all the horses, and the bulk of the outfit across to Pyramid harbour, which is about three hours run southwest from Skagway, and is on the west side of Chilkat inlet. This portion of the party immediately set to work to get the outfit up Chilkat river and then up the Dalton trail as far as possible. The boundary between British Columbia and the Yukon crosses this trail about one hundred and five miles northerly from Pyramid harbour.

I myself, with my assistant, Mr. Blanchard Dodge, and the remainder of the party left Skagway by the White Pass and Yukon railway on June 13 and reached Pennington, B.C., fifty-two miles north, the same afternoon. Next day the outfit was moved up to the boundary and work commenced on the part east of lake Bennett.

The boundary monument known as 'H' stands about fifty yards east of the White Pass and Yukon railway track, which here runs along the east edge of lake Bennett. It is plainly visible to anyone passing on the train, and is about one mile and a quarter north of Pennington. There is only a residence for an operator and two parties of railway sectionmen at Pennington, but all trains stop there, and it is possible for a person to stop there over night.

The boundary crosses a long steady incline as it goes easterly from monument 'H.' At a distance of a mile and a quarter it reaches the summit of the first mountain east of lake Bennett, at an altitude of about two thousand feet above the lake. As the line nears this summit it goes through a good deal of spruce timber, and a person standing on the shore of lake Bennett can clearly see three lines cut out against the sky at the summit. The most northerly of the three lines is the boundary between British Columbia and the Yukon.

Between lake Bennett and the summit just referred to there is a monument on a local shoulder about seven-eighths of a mile east of the lake. After reaching the summit the remainder of the boundary to Windy Arm is across a rough mountainous country. While it is unfit for pack horses, and we had to pack our outfit across our-

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selves, there is no difficulty in reaching any of the boundary monuments, and, except the eastern slope from mount Racine down to Windy Arm, there are no precipitous areas near the line. This section has already been described in detail in the departmental report for the year 1901. The total horizontal distance from lake Bennett to Windy Arm is a little over eight miles. There are monuments on the shores of both lakes and ten intermediate ones. The monument on the west shore of Windy Arm is known as 'G.' The next one west is three-quarters of a mile from Windy Arm, and stands in dense timber on the top of the westerly bank of a small stream flowing north and about one hundred feet up from its junction with Racine creek, which latter flows easterly around the north slope of mount Racine and empties into Windy Arm about half a mile south of the boundary. The next monument west is on the summit of mount Racine. Windy Arm is a little over a mile wide along the boundary. The most easterly post offsetted was that standing on its east shore.

The town of Wynton is situated just south of the boundary on the west shore of Windy Arm. Conrad is about six miles to the north. Much valuable ore has been found in this locality and a large amount of development work has been done, and several miles of aerial tramways have been constructed on the west shore north of the boundary. Some small work has also been done south of the boundary on the east shore.

There is a kind of pass by which one may easily cross the mountains from Wynton to Pennington, keeping near the boundary line. The route lies up the valley of Racine creek, keeping on the north side high up above the stream, until nearing its sharp turn to the south. Here the creek should be crossed and the southeasterly bank followed, which leads to a grassy open valley containing a small elongated lake through which Racine creek flows north. A boundary monument may be seen here, standing about 30 feet up the westerly slope of the valley, and about 100 feet northwest of the north end of the lake. After proceeding a quarter of a mile south of the lake, a wide, rough trough-shaped valley may be seen extending to the south of west. By following it westerly a stream flowing west is ultimately found. This should be followed down until about two and a half miles from the lake where it should be left, and a route taken a good deal higher up along the lower slopes of some mountains forming the southerly side of the wide valley. By proceeding along these slopes, the summit overlooking lake Bennett is reached with nothing worse than some deep ravines which run at right angles across the route. The descent to White Pass railway is easy, if one keeps a little north of the boundary.

The work near Windy Arm was completed on July 3 and next day we went by the steamer *Gleaner* to Cariboo on the White Pass railway and from there to Skagway. This steamer runs from June 1 to November 1 and connects Cariboo, Atlin, Conrad and Wynton. There are also smaller steamers on Windy Arm.

We left Skagway for Haines on July 6 and reached there after an adventurous voyage of two hours in the little mail steamer *Hegg* against a very rough sea. Haines is about eighteen miles southwest of Skagway.

From Haines we proceeded up the Chilkat and Dalton trail to the Yukon boundary. As the route taken is that usually followed, it is here described in some detail as far as Dalton Post which is seventy miles north of the international boundary.

Haines is the best seaport from which to proceed up the Dalton trail, provided no horses are taken. A long tongue of land runs down to the sea, between Chilkoot and Chilkat inlets. Haines is on the Chilkoot or east side; 'Hindistuckie,' five miles from Haines, is the name given to the point of embarkation for proceeding by water up the Chilkat, and is on the west side of the tongue of land. It is merely a name, and uncertain at that as I could not find anyone who would assume the responsibility of spelling it.

If horses are taken, there is only one trail for them at present up the Chilkat, and that is on the far side from Haines and 'Hindistuckie.' In order to avoid cross-

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ing them over the dangerous quicksands of the Chilkat, they should be landed, in the first instance, on the west side of this inlet at Pyramid harbour. This is a fine harbour and the Alaska Packers Association have a wharf there, but it is not a regular calling place for steamers.

From either 'Hindistuckie' or Pyramid harbour, canoes carrying two tons of freight each travel up the Chilkat as far as Wells, about twenty-seven miles up stream. They depend upon a prevailing south wind to take them against the currents. If this wind is not on hand when wanted, there is no redress. It is necessary to wait for it, as no headway can be made by any other means. We had to wait a day and then had such an apology for a wind that, after eleven hours on the water, we had to camp near midnight at Klukwan, a mile short of Wells. With a good wind which is fairly frequent, the distance to Wells is covered in six hours. When coming down in October we had a small gale blowing up stream against us.

Wells is on the west side of the Chilkat, at its junction with Klehini river, and is the head of navigation so far as freight is concerned. From here to Porcupine is thirteen miles. The United States authorities are building a first class wagon road between Wells and Porcupine, already sufficiently far advanced to save two dangerous crossings of the Klehini. The intention, I believe, is to extend the road northerly to Pleasant Camp to connect with the Canadian road from there, and also to build a road along the east side of the Chilkat from 'Hindistuckie' to Wells. When this is completed, Haines will be the best landing place for all outfits, with or without horses.

At Porcupine there is a postoffice and extensive mining works, and a trading store of the Porcupine Gold Mining company. It is seven miles over a good wagon road from here to 'Pleasant Camp,' but Klehini river must be crossed on the way. 'Pleasant Camp' is, in summer at least, a beautiful spot just within Canadian territory.

Beyond 'Pleasant Camp' only pack horses can at present be used, but a wagon road is now being constructed to 'Rainy Hollow,' which is fourteen miles farther. Some excellent copper ore has been found near 'Rainy Hollow' and a good deal of work is now in progress. The mining district is all in Canadian territory and, if reports are justified, it should become famous.

Two routes can be followed at present from 'Pleasant Camp' to 'Rainy Hollow'; one follows the valley of the Klehini, keeps low down in the timber, and is very bad; the other strikes high up in the mountains a couple of miles out from 'Pleasant Camp.' This upper trail crosses a kind of summit pass and is difficult to follow in bad weather. Most summit passes have no definite land marks. Their topography is open and rolling and there is often danger in a fog or snowstorm, that one may get down over the wrong watershed. The elevation of 'Rainy Hollow' is stated to be 2,700 feet.

The next stage to 'Glacier Camp' is about twenty-two miles, with no possible intermediate camping ground and no shelter of any kind if bad weather comes on. Timber is left at 'Rainy Hollow' and the trail gradually rises to an elevation of 3,800 feet. Just before the crossing of Clear creek, and about half way, the trail begins to descend and at 'Glacier Camp' is about 3,200 feet elevation. When nearing this camp the trail follows down the gravel bed of a large stream flowing northerly called Nadahini river (a branch of the Chilkat.) As soon as it leaves this river and turns up on the westerly bank, some spruce timber may be seen to the west, and it is better to camp here than to go on to the 'Cabin' where there is no firewood. This would be about a mile before reaching the 'Cabin.' Horses will surely go back to 'Mosquito Flats,' a kind of little prairie about four miles south of the 'Cabin,' but they will go back in any case. The 'Cabin' is about a quarter of a mile back from Nadahini river and visible in the high willows only when it is very close.

From 'Glacier' to 'Bear Camp' is fourteen miles. About nine miles from 'Glacier' the trail passes around the east side of a lake and then down a little canyon in which

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flows Mansfield creek, the trail following the edge of the stream. It then enters an extensive open dry area with willow bushes.

The boundary between British Columbia and the Yukon can now be easily identified, although still about six miles to the north. The valley of the Tatshenshini stretches away a little west of north, with a group of mountains standing out in the far distance, which are north of Dalton post. To the west of north and about seven miles away may be seen a high sharp ridge, running east and west. At the extreme east end of this ridge there is a dome-shaped prominence with a small terrace a little below its summit. The dome is the most easterly prominence on the sky line west of the Tatshenshini valley. On the summit of this dome there is a boundary monument. The ridge referred to is plainly visible from a point about a mile south of 'Glacier Camp,' and at intervals thereafter along the Dalton trail. On the east of the Tatshenshini valley is a high even-topped mountain range, running almost north. The boundary crosses about a quarter of a mile down the shoulder at the extreme southerly end of this range, and then passes east up the valley at its foot, which is the valley of Blanchard river. After travelling across the above mentioned open area the old ford across Tatshenshini river is reached, about seventy yards below the junction of a large stream coming in from the east. The ford is partly washed out and a better one may be obtained about a mile higher up the Tatshenshini. 'Bear Cabin,' a former stopping place of the Royal Northwest Mounted Police, stands apart from any river and about two miles northeast of the old ford. The best camping ground is obtained by leaving the Dalton trail shortly after entering the open area and going about a mile northeast to the large stream just mentioned.

From 'Bear Camp' to Dalton post is about twenty miles, with, however, several possible intermediate camping grounds. Two junctions of streams are crossed in deep valleys, called Sheep canyon and Horse canyon, and distant five and eight miles from the old ford. Either of these forms a good camping ground if the canyon is followed down a quarter of a mile from the trail. It is stated that a good pass is obtained across the mountain range west of the Tatshenshini by following up the most northerly of the two streams uniting in Sheep canyon. This pass leads to the head waters of a stream flowing westerly into the Tatshenshini, about two miles north of the boundary. I believe the Dalton trail reaches its highest elevation between Sheep canyon and the old ford. The trail enters timber about six miles north of Horse canyon and keeps in timber to Dalton post. The Tatshenshini can be forded opposite the 'post' if the water is very low, but the best ford is obtained a mile lower down. The 'post' is on the farther side. From Dalton post it is seventy-three miles to 'Champagne Landing,' and from there sixty miles by stage to Whitehorse. A branch trail runs southwest from Dalton post for forty miles along the west side of Tatshenshini river, which flows southerly after leaving Dalton post.

We left Haines on July 9 and reached Wells next day, where I found all the pack horses and the four men sent on from Skagway on June 12. They had transported all the outfit as far as 'Pleasant Camp,' and about three-quarters of a ton to 'Glacier Camp,' eighty miles from Haines. We all reached the boundary line in Horse canyon on July 23, having been delayed by high water in all the rivers and having to double trip part of the journey. Cloudy weather prevented observations for latitude being taken until the nights of July 29 and 30, when a point was established from the observations of twenty-four pairs of stars with the zenith telescope, with a probable error of 0.23 of a second. The point of observation was on the west bank of the Tatshenshini, about three-eighths of a mile south of the monument known as 'M.'

By August 7 a trial line had been run west from 'M' for a distance of nearly five miles to the summit of the mountain range west of the Tatshenshini. This range extends many miles southerly and northerly as far as Dalton post, where the Tatshenshini flows around the north end. It caused us delays aggregating at least two weeks during the season, and I refer to it below as the Barrier range. It was hard enough to get the

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line across, but out of the question to get the camp over, so we had to travel around by Dalton post, necessitating two crossings of Tatshenshini river in order to get at the end of the line west of the range.

I may say that both the Tatshenshini and Klehini rivers were constant sources of trouble and danger all season. Their current is so swift that a man on foot cannot ford them if the water is even up to his knees. Fords exist one day and are washed out the next, and added to all is the fact that the muddiness of the water prevents its depth from being known and the presence of huge boulders makes footing very insecure. Horses new to such rivers at first allow themselves to drift off a ford and pay no attention to their responsibilities, but after a time they learn to maintain their ground against the current to a remarkable degree. The average rate of the Tatshenshini is six miles an hour and the Klehini is swifter.

Having found the end of the line, it was continued on the Tatshenshini near station 'N,' where a long hunt for the former post ensued. It was subsequently ascertained that this post had been washed away in a flood on the river. Observations for latitude were taken again here on the east bank of the Tatshenshini on the nights of August 24 and 25, when a point was established from the results of the observation of twenty-one pairs of stars, with a probable error of 2.24 of a second. In the matter of taking observations for latitude Mr. Blanchard Dodge gave the most valuable assistance and I think will make a name for himself as an observer. The final boundary line was then run back easterly, the posts being offsetted to the true line and a new line cut out in the timber, and the whole completed to the summit of the Barrier range. Camp was then moved back easterly around by Dalton post, and the remainder of the boundary completed to the Tatshenshini at station 'M.'

On September 21 a trial line running east from 'M' was commenced and continued for five and three-quarter miles, where we ended operations for the season.

We started back for the coast on September 30. On the night of October 1, we were camped at 'Glacier' at an elevation of 3,200 feet, and four inches of snow fell. We crossed the summit next day in a snowstorm, which turned to fog and rain within a few miles of 'Rainy Hollow.' Next day the journey was continued to Porcupine in pouring rain, while no doubt heavy snow was falling on the summit we had just left, for on October 8 there was a depth of over three feet of snow there.

We reached Haines on October 6, and in the early morning of the 8th we crossed over to Skagway in the steamer *Georgia*, which plys between Juneau, Skagway and Haines. On the evening of the same day I paid off all the men, except one, allowing them their time to the date of their arrival at Vancouver, October 13.

I then proceeded with one man to Windy Arm where I corrected the position of a post on the boundary and returned to Skagway on October 14. Skagway was left on the 17th by Canadian Pacific steamer and I reached Vancouver on the 20th and Calgary October 23.

BOUNDARY LINE FROM STATION 'M' TO STATION 'N.'

Monument 'M' is situated in a dense growth of spruce on the east bank of Tatshenshini river about one hundred and thirty yards from the river, and twenty-two feet above its level. It is about half a mile above the junction of the stream coming down from Horse canyon. It can be reached from the Dalton trail by following down the north side of the streams in either Sheep canyon, which is best, or in Horse canyon, but the Tatshenshini has then to be forded in a bad place. I believe a trail could be cut north from 'Bear Camp,' keeping back some distance east of the Tatshenshini and striking the boundary where it crosses Blanchard river, when it is only a short distance west across a hill to 'M.'

The Tatshenshini is about one hundred and twenty feet wide and varies much in depth. As a rule it cannot be forded on the boundary line. Immediately after leaving the Tatshenshini the land rises rapidly to the first monument west of 'M,' which is

distant five-eighths of a mile and is 800 feet above it. It stands on a rough plateau overlooking the valley of Horse canyon to its northwest. The next monument is in the valley of Horse canyon, a little over half a mile west. It is one hundred and eighty yards west of where the Dalton trail crosses the northerly of the two streams which unite here, and is in poplar timber, about thirty feet above the level of the stream. The dome shaped mountain previously referred to can be seen here west of Dalton trail. It has apparently a double top with a small depression in which will probably be seen a wedge shaped snow patch. This mountain is referred to as Mount Kona. The monument on its summit is a mile and a quarter from the one near Dalton trail and 2,270 feet above it. Between these two there is another one on a rough turfy plateau of the kind known as a 'tundra.' It is nearly half a mile west of Dalton trail.

West of Mount Kona, on which is monument XIII at an elevation of 5,600 feet, the boundary crosses a very mountainous region for two miles and a quarter to the summit of the Barrier range. This portion contains two large snow fields and glaciers. There are two monuments, XII and XI, at altitudes of 6,140 feet, on spurs whose surface is a mass of boulders. About half a mile northwest of XII is a small lake at an altitude of 5,600 feet, whose border is a mass of ice.

The next monument, number X, is on the summit of the Barrier range and is at 6,520 feet altitude. From this point the huge mass of Mount St Elias can be clearly seen on the far western horizon, about one hundred miles away. About half a mile to the northwest of number X is Mount Beaton (6,900 feet), the highest peak in this neighbourhood. From the summit of this range there is a space of one and three-quarter miles, and a fall of 1,800 feet to the next monument farther west, the various spurs in the intervening area being composed of loose rocks, liable to slide at any moment, and not affording any stable position for a monument. This next monument is on the summit of a round topped mountain, altitude 4,728 feet. Number VIII is on a rough turfy plateau between the foot of the round-topped mountain and a small stream flowing south across the boundary. Number VII is three-eighths of a mile farther west and sixty feet west of top of the valley of the same stream. The elevations of these last two are 3,720 and 3,600 feet.

The boundary now enters timber and continues in it more or less all the way to the Tatshenshini. Monument VI is a little over a hundred yards east of the crossing of a large stream flowing northwest and is in thick spruce timber. I believe some valuable mineral will be found up this stream. It is the stream previously referred to as having its head waters connected by a pass with the stream flowing east through Sheep canyon on the Dalton trail.

The remaining four monuments to Station 'N' are in a rolling country. Monument 'N' is east of the Tatshenshini on a plateau 160 feet above the river and 132 feet back from the edge of the top of the bank. The elevation of the river is here 1,600 feet, a fall of 1,100 feet occurring in the river during its course of thirty-five miles from 'M.' The distance between monuments 'M' and 'N' along the boundary is a little less than eleven and one-half miles.

Any person looking for post 'N' should proceed southwest along the pack trail from Dalton post. After about thirteen miles a large stream, called Whitestone river, joins the Tatshenshini from the west; the trail crosses this river close to its junction with the Tatshenshini. About a mile below Whitestone river is Bridge creek, also on the west side, which flows in a small canyon. The boundary is between five and six hundred yards below the mouth of Bridge creek. The production of the line was cut out across a small timbered island and for a short distance into the timber on the west bank. The island is being rapidly washed away. It is difficult to ford the Tatshenshini near 'N,' and it is too swift for a raft. We forded it between Bridge creek and Whitestone river, but the horses had frequently to swim.

West of the Tatshenshini, the country contains rolling spruce covered hills for possibly fifteen miles when it reaches the foot of a lofty snow covered range running northwest, which attains an altitude of about 8,500 feet and holds many glaciers. Near

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the boundary there is a good deal of timber around Bear camp, where an extensive belt of spruce runs around the lower slopes of the hills which stand on the east side of the Tatshenshini valley between Mansfield creek and Blanchard river. On the west side of the valley there are also small areas of spruce. Along Tatshenshini river itself timber commences about two miles below the old ford near 'Bear camp,' and continues thereafter down the whole course of the river. Spruce follows up the Blanchard for about fifteen miles from its junction with the Tatshenshini. Small poplar occurs up the sides of nearly all the small streams. The limit of spruce appears to be about three thousand two hundred feet altitude. Poplar exists at a higher elevation than spruce in small sheltered valleys, and may be found up to three thousand four hundred feet, but on the open mountain sides and wide valleys it cannot live even as high as spruce. The nature of the soil may, of course, have something to do with this difference. Willow occurs as high as three thousand eight hundred feet if good soil happens to exist so high. The last of vegetation is reached, as a rule, about four thousand three hundred feet. The limit of poplar is almost reached on the boundary at the monument in Horse canyon which is at an elevation of three thousand three hundred and thirty feet. West of this there is no timber until monument VII is reached. The monument, at an elevation of two thousand eight hundred feet, is in thick timber and thereafter westerly the whole country is timbered. South of Dalton post a good deal of spruce occurs. There is no pine of any kind in the country.

With regard to any elevations given in the neighbourhood of the boundary, it may be stated that the elevations of points on the boundary were connected by trigonometrical processes and may be relied upon relatively. If any correction should be applied to the whole, such correction could be most easily found by a reference to the boundary monument in Horse canyon. This monument is close to the Dalton trail and therefore easily accessible to any person who believes he can ascertain its true elevation above sea level.

The season as a whole was fine. When we first reached lake Bennett on June 15 there was no snow even at altitudes of six thousand feet, except a few patches. I believe, however, that the country along the boundary near the White Pass railway has a milder climate than that near Dalton trail. June and July were fine with spells of heavy rain, but August had many fogs in the higher altitudes. The weather does not appear to change suddenly but oscillates back and forth from fine to bad weather. A storm may generally be expected to culminate four or five days after the first appearance of clouds following a spell of fine weather. The weather then slowly recovers. When preparing to take observations it is well to bear this in mind. On September 3, snow fell to an altitude of 5,900 feet, but four days afterwards a heavy rainstorm occurred and washed all the snow off up to 6,600 feet. I am inclined to think this storm would have been snow in most seasons. On September 18 four inches of snow fell as low as 3,000 feet, but this was obliterated by rain subsequently up to 4,700 feet, which was the snow line when we started homeward on September 30. On October 1 snow began to fall at 3,800 feet, and at this altitude there was a depth of three feet of snow on October 8. As regards the valleys, though both latitude and altitude are high, while the season lasts there is no very great difference from the season in the prairie provinces, but it ends suddenly and months earlier than in the provinces. To show that the climate is milder near lake Bennett and Windy Arm than farther west near Dalton post, I may say that when I was at Windy Arm on October 14, there was no snow at all along the boundary line, and even on the neighbouring higher peaks there was less snow than in the early summer.

Along the Dalton trail there is good grass nearly everywhere up to 3,500 feet, and horses do well during the season. I believe the country north of Dalton post opens earlier in spring than to the south, but people who have been to Dalton post both by the Whitehorse and by the Chilkat recommend the latter as the best route. The season for the passage of horses across the summits of the Dalton trail between

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'Pleasant Camp' and Dalton post would appear to be from June 5 to October 5. I would rather try to begin earlier than make any attempt to stay later. We were very fortunate, but I saw enough to be able to appreciate the dangers of these summits in bad weather.

Throughout the season I met with the utmost courtesy from all United States officials and others, while passing through Alaska, and wish to express my acknowledgment of the same.

I have the honour to be, sir,
Your obedient servant,

J. N. WALLACE, D.L.S.

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APPENDIX No. 43.

REPORT OF ARTHUR O. WHEELER, D.L.S.

PHOTO-TOPOGRAPHICAL SURVEY OF THE ROCKY MOUNTAINS.

CALGARY, ALTA., November 28, 1907.

E. DEVILLE, Esq., LL.D.,
Surveyor General,
Ottawa.

Sir,—I have the honour to submit the following report on the past season's operations:—

Work in the field was commenced on June 21, and a party sent to Paradise valley, near lake Louise, where it was required to obtain some missing photographic data. Here also the party, under instructions from the deputy minister, assisted the Alpine Club of Canada in the organization and effectiveness of its second annual camp. Without such assistance the camp would have been impossible, for there are as yet few trained mountaineers in Canada, and the members of my climbing parties acted as guides upon this occasion. These, through long experience, are the equals and in some respects the superiors of Swiss guides.

A word concerning the Alpine Club may not be amiss. It was organized on March 27, 1906, with a membership of 79, which has in less than two years increased to over 300. Members are scattered through the length and breadth of Canada, from Halifax to Vancouver. The membership is not confined to Canada, but extends to Australia, South Africa, France, England, Ireland and the United States of America, where it has representatives in ten states of the union. Three members of the Alpine Club of England, the oldest and most exclusive of all the Alpine clubs of the world, and three Fellows of the Royal Geographical Society, are among the Canadian club's members.

The result of the organization is the springing up of a most enthusiastic appreciation of Canada's mountain regions by Canadians, especially noticeable during the past summer, when more real mountaineering was done in the Canadian Rockies than for three years previous, not only by our own people but by people from other countries.

The value of the club was immediately recognized by the Canadian Pacific Railway company, and this powerful corporation has given it all possible assistance since its inception, quickly foreseeing that the thousands of which its membership will ultimately consist will be the best possible medium for converting the splendid Alpine tracts of Canada into a revenue producing centre, such as the European Alps, from the inflow of tourists.

On July 15 the survey party was sent to Golden, B.C., in charge of M. P. Bridgeland, D.L.S., my chief assistant, and climbing and photography for mapping purposes was immediately begun.

Accompanied by two assistants and a packer I made a flying trip up the Yoho valley to the Yoho glacier, where metal plates had been set out the previous year for the purpose of ascertaining the rate of movement of the great ice tongue here out-flowing from the Wapta ice field. Too little attention has been bestowed upon this branch of science by the government surveyors in the mountains, and, though possessing the best opportunities owing to the vast areas of ice and snow distributed

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along the higher portions of the several mountain ranges, most of the observations made so far have been by scientists from other countries.

Having checked the movements of the plates for the year, and made a quick photographic survey of the icefall and surrounding valley, I proceeded to Golden and, organizing two parties, crossed Columbia river. One party under Mr. Bridgeland was put to work in the Dogtooth mountains on the headwaters of Grizzly and Quartz creeks. With the other I carried the work southward along the west side of Columbia river.

On August 25 Mr. Bridgeland's party recrossed Columbia river and commenced a survey of the Beaverfoot range southward along Columbia river valley. At the same time I pushed into the Spillimacheen mountains with the intention of paralleling the work of the party on the east side of the Columbia.

Much delay and hindrance was caused to the work by the exceptionally stormy wet weather encountered during the months of August and September. It was intended that Mr. Bridgeland's party should work southward to the junction of Kootenay and Columbia rivers, but it was found impossible to get farther than thirty miles from Golden.

On the other side of the Columbia the dense forests extending many miles back from the stream forced us to keep to the heads of the tributary streams and to work from these sources to the peaks overlooking the valley of the main waterway.

Between the north and south branches of Spillimacheen river and southward therefrom lies a magnificent tract of truly Alpine country, with wide icefields reaching in every direction, from which rise sharp peaks, snow-clad domes and rocky precipices in the wildest confusion, many of the peaks attaining an altitude of little less than 11,000 feet above sea level. Icefalls are everywhere and waterfalls leap from sheer heights many hundreds of feet, to the beautiful Alpine valleys below. This tract is practically unknown and unmapped; the peaks are unnamed, and, except in so far as it has been visited by the mining prospector, it is a new region and yet remains to be explored. It is the home of the caribou and wild goat, and would furnish a paradise for the tourist and lover of nature if properly brought to notice. Moreover, Columbia river as a navigable waterway, and pony trails made by prospectors up the main valleys to numerous mining prospects, render it comparatively easy of access.

On September 19, owing to the continued wet weather, and the necessity of doing some work up Blaeberry river, and along the Columbia below Golden, I crossed the river and called in Mr. Bridgeland's party. This party was now sent up the Blaeberry to obtain sufficient data to enable the work carried northward from Kicking Horse valley to be mapped along the Blaeberry.

With my own party, I made a flying trip up Bluewater river and occupied several peaks in that vicinity. I then, with Donald as a base, occupied three of the outlying peaks of Dogtooth range as far as Quartz creek near Beavermouth, thus completing the work which Mr. Bridgeland had been unable to finish owing to bad weather.

The last two weeks of October were occupied by Mr. Bridgeland's party in making a traverse up Blaeberry river to tie in the camera stations he had previously occupied. With my own party I made a traverse along the railway from Donald to Beavermouth, using the railway as a base to tie in the camera stations occupied on both sides of the Columbia valley.

October was an exceptionally fine month and good work was accomplished, thus saving an otherwise disastrous season. The survey was closed upon that previously made of the Selkirk range and information is now at hand to furnish topographical maps of the mountain area lying along both sides of the Canadian Pacific railway between The Gap at the eastern escarpment and Revelstoke at the second crossing of Columbia river. This belt of topographically surveyed country extends largely to the limits of the railway belt.

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During the season forty peaks were climbed and seventy-seven camera stations occupied thereon. In addition twenty-four camera stations were occupied along the railway at various points of vantage. Four hundred and thirty-one plates were exposed and data completed to enable the mapping of more than one thousand square miles of mountain country, which work will be performed during the coming winter and spring.

I have the honour to be, sir,

Your obedient servant,

ARTHUR O. WHEELER, *D.L.S.*,
Topographer of the Department of the Interior.

DESCRIPTIONS OF TOWNSHIPS

DESCRIPTIONS

OF

SURVEYED TOWNSHIPS

SUBMITTED BY DOMINION LAND SURVEYORS DURING THE SEASON OF

1907-1908

APPENDIX No. 44.

LIST OF TOWNSHIPS DESCRIBED.

EAST OR PRINCIPAL MERIDIAN.		WEST OF PRINCIPAL MERIDIAN— <i>Con.</i>	
Township.	Range.	Township.	Range.
14, 15.....	7	24, 44.....	30
15, 16, 17.....	8	44.....	31
15, 16, 17.....	9	30, 44. 45.....	32
16, 17.....	10		
6, 12, 13, 14, 15, 16, 17 ..	13		
6, 7, 8, 12, 13, 15, 16 ..	14		
1, 12, 15, 16.....	15		
16.....	16		
16.....	17		
WEST OF PRINCIPAL MERIDIAN.		WEST OF SECOND MERIDIAN.	
26, 27, 28.....	1	37, 38, 45.....	1
28.....	2	37, 45.....	2
28.....	3	37, 38, 45.....	3
18, 22, 28.....	4	38, 39, 40, 45.....	4
14, 15, 21, 22, 28.....	5	38, 39, 40, 45.....	5
14, 22.....	6	37, 38, 39, 40, 45 ..	6
22.....	7	39, 40, 45.....	7
22.....	8	45.....	8
21, 25, 26, 28, 29, 32....	10	45	9
25, 26, 28, 32.....	11	38, 40, 45.....	10
26, 28, 32.....	12	38, 39, 40, 45.....	11
26, 28, 32.....	13	41, 42, 43.....	12
23, 26, 28, 32.....	14	30, 31, 50, 51, 52.....	15
10, 32	15	30, 31, 50, 51, 52.....	16
10, 32, 51 ..	16	1, 2, 30, 51, 52	17
32.....	17	1, 2, 51, 52	18
32.....	18	49, 51, 52.....	19
32 ..	19	50, 51, 52.	20
41.....	25	50, 52	21
41, 42, 43, 44.....	26	44, 51, 52	22
44.....	27	4, 46, 50, 52	23
44.....	28	4, 51, 52.....	24
44.....	29	9, 51, 52.....	25
		9, 45, 49, 52	26
		9, 41, 42	27
		41, 42.....	28
		6, 20, 21, 22.....	29
		4, 5, 6, 17	30

List of Townships Described—Continued.

WEST OF THIRD MERIDIAN.		WEST OF FIFTH MERIDIAN.	
Township.	Range.	Township.	Range.
4, 5, 6, 7, 8, 9, 10, 11, 21, 22, 24, 33, 34, 35, 37, 38, 52	1	13, 14	1
4, 5, 6, 7, 8, 9, 10, 11, 12, 21, 22, 23, 24, 33, 34, 38, 52	2	10, 11	2
5, 11, 12, 51	3	11	3
11, 12, 50, 51	4	20, 21, 22, 44, 47	4
10, 11, 12	5	48, 49, 54, 55, 56	5
11, 12, 34, 35, 48	6	49	6
11, 12, 48, 49	7	54, 55, 57	7
11, 12	8	54	9
11, 12	9	53, 54, 55, 56	10
11, 12	10	53, 54	11
47	11	53, 54	12
11, 12, 49	12	52, 53, 54	13
10, 11, 49	13	52, 53, 54, 73, 75	14
49, 50, 51, 52	14	52, 53, 54, 73, 74, 75, 77	15
49, 50, 51, 52	15	52, 53, 54, 77	16
8, 52	16	51, 52, 53	17
8	17	52, 53, 54	18
8	18	52, 53	19
8	19	52, 53	20
8	20	52, 53, 84	21
8	21	52, 53	22
51, 52, 53, 54	27	52, 53	23
54	28	51, 52, 53	24
		30, 31, 51, 52, 53	25
		31, 32, 52, 53	26
		52, 53	27

WEST OF FOURTH MERIDIAN.		WEST OF SIXTH MERIDIAN.	
4, 27, 28, 29, 30, 31	6	23	2
27, 28	7	77, 78, 79, 80	3
1, 2, 3, 4	8	80	4
1, 2, 3, 4, 60	9	19, 71, 72, 78	6
1	10	19	7
1	11	18	8
1, 7, 8	12	17, 18, 19	9
2, 8, 65, 66	13	17, 18, 19	10
1, 2, 33, 34, 67, 68	14	17, 18	11
29, 30, 33, 34, 66, 67, 68	15	18	12
29, 30, 33, 34	16	18, 19	14
33, 34	17	19	15
29, 30, 31, 32, 33, 34	18	20	18
29, 30, 31, 33, 34, 66, 67, 68	19	20	19
29, 30, 31, 32, 33, 65, 66, 67, 68	20	20, 21	20
29, 30, 31, 65, 67, 68	21	19, 21	21
10, 11, 24, 66, 67, 68	22	16, 20	22
60, 67, 68	23	15, 16, 20, 21	23
10, 13, 65, 66, 67, 68	24	20	24
65	25	17, 22, 23	25
10	29	19, 20, 21, 22	26
		2	29

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DESCRIPTIONS OF TOWNSHIPS.

NOTE.—Numbers of townships are placed in heavy type on the left margin of the pages in the descriptions of townships.

TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 7.

14. The greater portion of the west part of this township is rolling red sand and jackpine ridges while the remainder is poplar bush, tamarack swamp and sloughs. The soil in the tamarack swamps is generally of a quicksand nature. Most of the merchantable timber has been removed to market via Tyndale on the main line of the Canadian Pacific railway. Many old lumber roads are to be found also the almost decomposed remains of the old lumber camps. An old lumber trail was found throughout the length of the west boundary of the township. These are only winter roads impassable in the summer time.—*C. F. Aylsworth, D.L.S., 1907.*

15.—The greater portion of this township for two miles south of the Indian reserve is a floating tamarack muskeg, and the greater portion of the balance of this township is rolling jackpine, sand and gravel ridges.—*C. F. Aylsworth, D.L.S., 1907.*

Range 8.

15, 16 and 17.—My route of approach to the east boundary or townships 17 and 16, range 8, and north boundary of township 15, range 9, was from the east by way of Lac du Bonnet, branch of the Canadian Pacific railway. I believe, however, that these lines may be more easily approached from the Brokenhead settlement on the west. The whole of the east boundary of townships 16 and 17, range 8 passes through an extensive marsh, containing a few scattered tamarack, willow scrub, rushes and long grass. The northern boundary of township 15, range 9 passes through a wooded district, except north of section 31, and the west half of 32 where the line is situated in the marsh. This district is therefore very flat and wet, the only dry portion being the north boundary of sections 33, 34, 35 and 36, township 15, range 9, where the surface is slightly undulating. The only timber occurring upon the above mentioned lines is found on the north boundary of sections 33, 34, 35 and 36, township 15, range 9, where spruce, tamarack and poplar are found, though not in sufficiently large quantities or dimensions to be of great value for lumbering purposes. There is a large amount of hay land extending along the eastern boundary of townships 17 and 16, range 8, and along the north boundary of sections 31 and 32, township 15, range 9, but because of the extremely soft nature of the ground upon which it grows the district is very difficult of access, although it is possible that it may be reached from the Brokenhead settlement. No bodies or streams of fresh water occur along the above mentioned lines, although abundance of surface water is found everywhere throughout the marshy sections. No water-power occurs along these lines. As the city of Winnipeg is only a short distance from this township the climate is very similar in both localities, being comparatively dry with occasional extremes of both heat and cold. It is, however, suitable for the successful growing of all the ordinary Canadian cereals. An abundant supply of fuel can be obtained from the surrounding forest. Coal is not known to exist in the locality. No stone quarries nor minerals of economic value are known to occur. Several species of large game are very plentiful in this district, particularly moose, many fine specimens of which were observed during our survey. A smaller variety of deer, commonly known as jumping deer are also numerous, and black bear are occasionally met with. Ruffed grouse and spruce partridge are comparatively common but few other birds of any description were observed.—*J. W. Tyrrell, D.L.S., 1906.*

TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 9.

15. This township is situated about twelve miles south of Fort Alexander and about the same distance northwest of Lac du Bonnet, the terminal point of a short branch of the Canadian Pacific railway, from which point it is most easily accessible. On account of extensive marshes and swamps in the neighbourhood the township is very difficult of access, at any time of the year, except when the swamps are solidly frozen, which does not always occur even in winter, when a great depth of snow falls early in the season. There is nothing in the shape of a travelled highway, or even a well opened bush road into this township, the only means of access being over a winter road cut by the party during my survey. This road leads in a northwesterly direction from Lac du Bonnet into the centre of township 16, range 10, thence directly west to the centre of this township, and from this point in a northerly direction to township 17, range 9. The soil of this township varies from black muck in the western part to clay in the more central districts and sand and boulders in the east. Many central sections when cleared of timber appear to be well suited for general farming purposes, the eastern sections being more hilly and strewn with great boulders rendering the soil less fit for cultivation, but quite suitable for grazing purposes. As above stated, the eastern portion of this township is somewhat hilly. The end of a long gravel ridge, which reaches several miles to the east extends over portions of sections 13, 24 and 25. The summit of this ridge crosses the eastern boundary near the northeast corner of section 13, and is about one hundred feet above the surrounding country. A large portion of this ridge is covered by jackpine timber. The central portion of the township to the west of the above mentioned ridge is covered chiefly by poplar, birch and spruce timber, little of which was found to be of large size. The most westerly tier of sections is composed almost entirely of marshy land, overgrown in part with small tamarack, willow and alder scrub. This marsh even at the date of my survey (February) was still so soft as to barely carry our party, and was quite too soft to carry the teams. Although the greater portion of this township is covered with timber, little was found to be of sufficient size or quality to be of value for milling purposes. A few spruce occur in various places sufficiently large to be sawn into lumber. The same may be said of the jackpine covering the central portion of the eastern tier of sections, but the quantity is too limited to make the township of value as a timber berth. There is one large hay meadow in this township, occupying a portion of sections 22, 23 and 27 in the centre of which is a small open slough. Hay is also found on the most westerly tier of sections in the township, but because of the soft marshy nature of the country on which it grows access to it is very difficult and it will probably be of little value until a system of drainage is established. The only open water occurring in this township is found in a small slough situated upon the northeast quarter of section 22, although an abundance of surface water is found everywhere upon the marshy sections in the western portion of the township. It might be mentioned that some fresh water springs were observed on the northern slope of the centre ridge in sections 25, 24 and 13. No water-power exists in this township. As this township is close to the city of Winnipeg, the climate is very similar in both localities, being comparatively dry with occasional extremes both of heat and cold. It is however not such as to prevent the successful growing of all the ordinary Canadian cereals. The township is abundantly supplied with fuel from the forest. Coal is not known to exist in the locality, but there is an abundance of wood in all parts of the township. No rock exposures are known to occur in this township from which building stone might be quarried. No minerals of economic value are known to occur. Several species of large game are very common in this township and surrounding district, particularly moose, many fine specimens of which were observed, during our survey. A smaller variety of deer, commonly known as jumping

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 9—Continued.

deer, are also numerous, while black bear are occasionally met with. Ruffed grouse and spruce partridge are comparatively common, but few other birds of any kind were observed.—*J. W. Tyrrell, D.L.S., 1906.*

15.—There is no summer road at present reaching this township but a good winter road crosses from Milner siding on the east to Brokenhead river country on the west passing across the southern part of the township. On May 24 this road was frozen solid where it crossed the muskegs. The only good land there is exists in isolated sections. The township is mostly swampy except some very stony ridges of sand. Most of the surface is covered with timber ranging from scrub and deadfall to large poplar and spruce. There are some hay meadows in the northeast corner of the township and also near the west boundary along the edges of marshes existing there. The water is all fresh. There are some small creeks but they were not located or noticed in the winter as the snow was deep. They flow from the muskegs westerly into the marshes. No stone, minerals, coal or water-powers were observed. Moose, deer, chicken, wolves and small game are found.—*Geo. H. Watt, D.L.S., 1906.*

15, 16 and 17.—My route of approach to the east boundary of townships 17 and 16, range 8 and north boundary of township 15, range 9, was from the east by way of Lac du Bonnet, branch of the Canadian Pacific railway. I believe, however, that these lines may be more easily approached from the Brokenhead settlement on the west. The whole of the east boundary of townships 16 and 17, range 8, passes through an extensive marsh, containing a few scattered tamarack, willow scrub, rushes and long grass. The northern boundary of township 15, range 9 passes through a wooded district, except north of section 31, and the west half of 32 where the line is situated in the marsh. This district is therefore very flat and wet, the only dry portion being the north boundary of sections 33, 34 35 and 36, township 15, range 9, where the surface is slightly undulating. The only timber occurring upon the above mentioned lines is found on the north boundary of sections 33, 34, 35 and 36, township 15, range 9, where spruce, tamarack and poplar are found, though not in sufficiently large quantities or dimensions to be of great value for lumbering purposes. There is a large amount of hay land extending along the eastern boundary of townships 17 and 16, range 8, and along the north boundary of sections 31 and 32, township 15, range 9, but because of the extremely soft nature of the ground upon which it grows the district is very difficult of access, although it is possible that it may be reached from the Brokenhead settlement. No bodies or streams of fresh water occur along the above mentioned lines, although abundance of surface water is found everywhere throughout the marshy sections. No water-power occurs along these lines. As the city of Winnipeg is only a short distance from this township the climate is very similar in both localities, being comparatively dry with occasional extremes of both heat and cold. It is, however, suitable for the successful growing of all the ordinary Canadian cereals. An abundant supply of fuel can be obtained from the surrounding forest. Coal is not known to exist in the locality. No stone quarries nor minerals of economic value are known to occur. Several species of large game are very plentiful in this district, particularly moose, many fine specimens of which were observed during the survey. A smaller variety of deer, commonly known as jumping deer are also numerous and black bear are occasionally met with. Ruffed grouse and spruce partridge are comparatively common, but few other birds of any description were observed.—*J. W. Tyrrell, D.L.S., 1906.*

17.—Because of extensive swamps and muskegs, situated both to the east and west access to the township is very difficult except during the winter season,

TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 9—Continued.

when the swamps are solidly frozen. During the past winter while I was engaged in the survey of this township I found that the frost did not penetrate these swamps, owing to the deep snow occurring early in the season and they were but slightly frozen throughout the entire winter. Consequently it was with the greatest difficulty that I was able to gain access to the various parts of the township having to make roads by tramping the snow with snowshoes and allowing it to freeze solidly for some days previous to our passing over it. The township is situated about six miles directly south of Fort Alexander and when the swamps are frozen it is very easily reached from that place. The soil of the eastern portion of this township is composed chiefly of heavy clay, while the western part consists almost entirely of soft muskeg or marsh, which in some places is grown up with small scrub, tamarack and willow, while other parts are more open, containing only tall rushes and long bluejoint grass, which in some places was observed to be eight feet high. There is a considerable area of land in the eastern sections of the township well situated for general agricultural purposes, after being cleared of timber, but the whole western portion of the township is utterly unfit, in its present state, for occupation in any capacity. It seems quite probable, however, that even this marshy section of country can be drained as it is situated comparatively near Winnipeg river and at considerable height above it, and the construction of a drainage system, therefore, might change this marsh area into very valuable land. The surface of the eastern portion of this township is more or less rolling and hilly in some places, but the western portion comprises one vast flat, marsh grown up, as already stated with tamarack, willow and rushes. The distribution of timber corresponds practically to that of the dry land, and thus occurs upon the eastern sections of the township. The chief variety is white poplar, although a few spruce and tamarack, large enough for lumber occur scattered throughout the various sections of the township. As a whole, the township may be said to contain a comparatively small amount of valuable timber, by far the greater portion being covered with small tamarack and black spruce. A large quantity of bluejoint and other varieties of grass occur upon the western half of this township, but under present conditions it is of little or no value, as during the ordinary seasons access to it is quite impossible. On the west part of section 22 I discovered a small stack of hay, which had been cut several years previously but could not be removed owing to the land being too soft to admit of the passage of horses or wagons. No lakes or fresh water streams of any importance occur upon this township, but almost the entire surface is abundantly supplied with marsh or swamp water. No water-power occurs in this township. As the city of Winnipeg is only a short distance from this township the climate is very similar in both localities, being comparatively dry with occasional extremes both of heat and cold. It does not however prevent the successful growing of all the ordinary Canadian cereals. The township is abundantly supplied with fuel from the forest. Coal is not known to exist in the locality but there is an abundance of wood in all parts of the township. Few rock exposures occur in this township, as the greater part of the surface is composed of swamp or marsh. A few bluffs of granite however, were noticed in some of the eastern sections, and it is possible that from these good building stone might be obtained. No minerals of economic value are known to occur. Several species of large game are very abundant in this township and surrounding district, particularly moose, many fine specimens of which were observed during our survey. A smaller variety of deer commonly known as jumping deer is also very common and black deer are occasionally met with. Ruffed grouse and spruce partridge are comparatively common, but few other birds of any description were observed.—*J. W. Tyrrell, D.L.S., 1906.*

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Range 10.

16.—This township is situated about five miles northwest of Lac du Bonnet, the terminal point of a short branch of the Canadian Pacific railway and it is most easily approached by means of a winter road, from that place. On account of more extensive marshes and swamps in the neighbourhood, the township is more or less difficult of access, at any time of the year, except when the swamps are solidly frozen, which does not always occur even in winter, when a great depth of snow falls early in the season. There is nothing in the shape of a travelled highway or even a well opened bush road into this township, the only means of access being over a winter road cut by the party during my survey. This road leads in a northerly direction from Lac du Bonnet into the centre of the township. The soil varies from black muck and peat in the east to sand and boulders in the west and central sections, most of the latter being traversed by a high sandy ridge covered chiefly by jackpine timber. The greater portion of this township is entirely too wet in its present condition to render it suitable for settlement, although when a system of drainage is introduced the greater portion of it will doubtless be found quite suitable for cultivation and the raising of all ordinary farm produce. The central and western sections of this township are occupied by a high gravel ridge, the surface of which is strewn with huge boulders, and is otherwise covered with jackpine forest. The eastern and southern portions are chiefly flat and marshy and too wet in their present condition for cultivation. There is a very considerable amount of jackpine, spruce and tamarack timber occurring upon the sandy ridge occupying the west central sections of the township but the remainder is wooded with small poplar and tamarack scrub. A considerable amount of marsh hay occurs in the swampy sections of the eastern part of the township, although on account of the extremely wet, soft character of the ground upon which it grows it is of little value because access to it is very difficult. No bodies or streams of open water were observed in this township, although large quantities of surface water occur everywhere upon the marshy lands to the east and south. No water-power exists in the township. As the city of Winnipeg is only a short distance from the township the climate is very similar in both localities, being comparatively dry with occasional extremes of heat and cold. This does not, however, prevent the successful growing of all the ordinary Canadian cereals. The township is abundantly supplied with fuel from the forest. Coal is not known to exist in the locality, but there is abundance of wood in all parts of the township. Several exposures of granite occur upon sections 2 and 3 of this township and from these, as well as from enormous boulders scattered over the sandy ridge occupying the central and western sections of the township it is quite probable that a good quality of building stone may be obtained. No minerals of economic value are known to occur. Several species of large game are very numerous in this township and surrounding district, particularly moose, many fine specimens of which were observed during our survey. A smaller variety of deer, commonly known as jumping deer, is also plentiful while black bear are occasionally met with. Ruffed grouse and spruce partridge are comparatively common, but few other birds of any description were observed.—*J. W. Tyrrell, D.L.S., 1906.*

17.—This township is situated about eighteen miles east of the south end of lake Winnipeg, thirty miles north of the main line of the Canadian Pacific railway and twelve miles northwest of Lac du Bonnet, the terminus of a short branch of that railway. Access to this township is by no means easy, not on account of its remoteness, but on account of it being almost completely hemmed in by wide expanses of muskeg, too soft, unless frozen, to admit of being crossed by wagons or pack horses. It can be reached from Fort Alexander, twelve miles northwest by what is known as

TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

Fort Alexander trail, which traverses sections 35, 36, 25, 24 and 13, but I found it more convenient to reach the township from Lac du Bonnet, and in doing so had to cut a bush road along the bank of Winnipeg river as far as section 9, township 17, range 11,, where we struck the winter road to Fort Alexander and followed it to the east boundary of the township, though this road had also to be recut to admit of the passage of the wagons. Although two weeks were spent in cutting this road, there is still no through summer highway from Lac du Bonnet, as in many places we followed the shore of the river or lake, which would be under water during the earlier part of the summer. The south and west sections of this township may be described generally as swampy, and the soil varying from a half decomposed moss to a rich black muck. The northeast portion of this township, however, is somewhat higher and the soil is composed chiefly of a light sandy clay of fairly good quality. A large portion of this township being composed of muskeg is very flat, but the northeast sections toward Winnipeg river are more rolling, with enormous rock exposures and are generally heavily timbered with white poplar, spruce, balsam, tamarack, ash and birch, while the southwest sections are wooded chiefly with tamarack, black spruce, willow and alder scrub. There is a considerable amount of good spruce and tamarack timber found throughout the eastern half of the township except in sections 2 and 3. The spruce varies in size from about eight to twenty-four inches in diameter while tamarack is found as large as twenty inches in diameter. Though of less value white poplar predominates and is occasionally found as large as twenty inches in diameter. There is very little hay land in this township, as it is mostly heavily timbered. A considerable amount of hay and long coarse grass occur in many of the western sections of this township, but the land is entirely too wet to admit of hay being cut. Winnipeg river is the chief water supply of this township. It flows through sections 25 and 26, and is a very large stream. The greater part of the township is very wet which is a great drawback towards its occupation. No water-power exists in this township. There are several falls along Winnipeg river but none within this township. As the city of Winnipeg is only a short distance from this township the climate is very similar in both localities being comparatively dry with occasional extremes both of heat and cold. This does not, however, prevent the successful growing of all the ordinary Canadian cereals. The township is abundantly supplied with fuel from the forest. Coal is not known to exist in the locality but there is abundance of wood in all parts of the township. Enormous exposures of granite occur in some of the northeast sections of this township and although no quarries have yet been opened up it seems quite probable that a fine quality of building stone might be available. No minerals of economic value are known to exist in this township. Several species of large game are very numerous in this township and surrounding district, particularly moose, many fine specimens of which were observed during our survey. A smaller variety of deer, commonly known as jumping deer are also plentiful, and black bear are occasionally met with. Ruffed grouse and spruce partridge are comparatively common, but few other birds of any description were observed.—*J. W. Tyrrell, D.L.S., 1906.*

Range 13.

6.—All the land in this township ranks as third class. The soil is mostly black loam with a sandy subsoil, but the township is made up mostly of spruce and tamarack swamps covered with heavy bush and these, if cleared and drained, would make good land for farming purposes. The surface is nearly all level and covered with spruce and tamarack, but along Whitemouth river, which runs through the south half

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 13—Continued.

of the township, there is considerable poplar and thick willow. The spruce, tamarack and poplar range in size from four to ten inches in diameter. The spruce and tamarack is equally distributed throughout the whole township, but the poplar is found only along Whitemouth river. Hay can be cut all along the banks of the river. The water is all of first class quality and is very plentiful. If not found on the surface it can easily be had by digging a few feet. The water in Whitemouth river is first class. There are no water-powers available. The climate is the general Manitoba climate, with no indication of summer frosts. Fuel is very plentiful and can be had all through this district, consisting of spruce, tamarack, poplar and jackpine. There are no coal or lignite veins, stone quarries or minerals of any kind. The only game to be found is moose and bear, which are very plentiful. There are no trails running through the township, but the Dawson road is a few miles to the north of the township, running to Ste. Anne, a town on the Canadian Northern railway, where there are stores, schools, post office, &c.—*John Molloy, D.L.S., 1906.*

12.—(*Base line*)—Starting from Whitemouth we crossed Whitemouth river by a bridge about one-half mile south of the village, and followed a good road east and north till we reached a Swede's house at the north boundary of township 11, range 12. Here the good road ended and from this point we followed the north boundary of the township through one and one-half miles of muskeg, where we had to put brush across the trail. We crossed Bog river by means of a bridge which we built, and from there we turned northeast following a trail which struck the east boundary of township 12, range 12, just south of the northeast corner of section 12. We followed this east boundary north to within three-quarters of a mile of where our survey began, which was as near as we could get to it with horses on account of muskeg. The land all along this base line is entirely unfit for agriculture. Moose, rabbits and prairie chickens were plentiful. No minerals of economic value were found. The climate is similar to that of other parts of Manitoba. The country along the north boundary of this township is muskeg, broken by numerous rocky ridges from twenty to sixty feet high. It has been swept by fire and is now covered by dead pitchpine and poplar, heavy windfall and small green poplar, willow and pitchpine. Little Rennie river crosses the north boundary of section 31, flowing northwest. There are no water-powers. Some hay could be cut near the river.—*B. J. Saunders, D.L.S., 1906.*

13.—The township may be reached by a sleigh road from Whitemouth in winter, or in summer by boat or canoe on Winnipeg, Shell and Little Rennie rivers. Large areas of good soil are not to be found. The surface of the southern two-thirds of the township is, generally speaking, rough and rugged, with bare granite hills or knolls protruding from the muskeg. The slopes of the rocky ridges are timbered with second growth spruce, poplar and jackpine, all standing in a mass of deadfall and upturned roots. In the northern part of the township there are some large muskegs with practically no valuable timber. On the higher ground a few spruce may be found scattered through the woods, which are mostly poplar with everywhere a tangled mass of maple, hazel and birch undergrowth. Along Little Rennie river in the east half of the township there are good hay meadows, some of which are liable to be flooded when Winnipeg river rises in the late summer. Fresh water is everywhere plentiful. The Little Rennie is navigable for boats drawing three feet of water for about ten miles in this township, where two falls occur, one six and the other about fourteen feet high. The river is from sixty to two hundred feet wide and has little current. There is very little difference between the level of Winnipeg river and that of this

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Range 13—Continued.

river where it crosses section 8, that is, in ordinary late summer levels. Rock exposed is everywhere the pink granite of northern and Western Ontario. No minerals were seen. Bear, moose, caribou and deer are plentiful; also pike and pickerel in the river, and countless numbers of ducks in the fall of the year.—*Geo. H. Watt, D.L.S., 1907.*

14.—This township may be reached by canoe on Winnipeg river either from Kenora or Lac du Bonnet. The only soil of any value is in small strips or areas along the riverside. The surface is everywhere timbered, but some has been overrun by fire and brulé, and deadfall in the northern part of the township is most difficult to travel over. The timber is principally poplar and jackpine, with thick growth of underbrush everywhere. There is no hay in this township. The water is everywhere good especially in Winnipeg river, which is a beautiful stream. There are no water-powers, stone quarries or minerals. The climate seems to be good, no summer frosts being experienced. Game is plentiful, moose, caribou, deer and bear having at different times been seen by my party. Small game and wildfowl are also to be found in season.—*Geo. H. Watt, D.L.S., 1907.*

15.—The township is crossed by the tramway being built by the city of Winnipeg, which crosses the township from west to east along the north interior chord. The northerly third of the township is mostly burned over but the remainder is timbered with fair sized poplar, spruce, birch and jackpine of fair size. The surface is everywhere broken by rock ridges covered with jackpine, some of them burned over. Between the ridges where there is no muskeg there is mostly clay soil supporting a heavy growth of poplar and birch, with dense underbrush. The soil is good but areas of it are so much broken by ridges of rock that for farming purposes the township is of very little value. There is little hay though water everywhere in creeks and in Rice lake is fresh, and good to drink. I know of no minerals, stone quarries or water-powers. Moose, deer, caribou, bear, lynx and wolves are numerous.—*Geo. H. Watt, D.L.S., 1907.*

16.—From Whitemouth we proceeded by a good winter road to the village of Lac du Bonnet. Thence we followed a well travelled road, north, along the west bank of Lac du Bonnet, for about five miles. From this point we travelled across Lac du Bonnet to the northeast corner of the lake, where our survey began. On account of the great depth of snow it was impossible to judge as to the mineral resources of the country. A few moose were seen and many fresh tracks were noticed. Coyotes, rabbits and porcupines were also seen. The climate is similar to that of other parts of Manitoba. The country along the north boundary of township 16, range 13 is mostly rock with some low ground and muskeg and is totally unfit for agriculture. The surface is rolling and is heavily timbered with good spruce and poplar averaging about ten inches in diameter. Lac du Bonnet extends into the northwest corner of the township and Pinawa channel of Winnipeg river flows up the west side. The water is fresh and good and free from alkaline substances. Eight or ten miles to the south of Pinawa channel, are rapids and falls which are suitable for the development of power.—*B. J. Saunders, D.L.S., 1906.*

16.—This township is broken by Lac du Bonnet and may be reached by boat or canoe from the lake, or the northern part of the township may be reached by Oiseau river route and the southern part by canoe on the creek that flows out of Rice lake and empties into Lee river. There is very little soil of any value as such. There is a strip of poplar country bordering on the lake which might be tilled if the woods

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Range 13—Continued.

were cleared off. The surface is rough—much broken by granite ridges—some of them very abrupt and steep. The timber is mostly poplar, jackpine and spruce generally small sized, with occasional heavy woods. The southern part of the township has been burned bare and is covered with second growth timber and scrub. I do not think there is any timber large enough for ties. There is little or no hay to be found. The water is everywhere good and fresh. There are no water-powers. I have seen no stone quarries or minerals of any kind. Game abounds, moose, deer, caribou, bears, lynx, &c., and are often seen in season. Wolves are plentiful this winter.—*Geo. H. Watt, D.L.S., 1907.*

17.—The township may be reached by boat or canoe from Lac du Bonnet which encroaches on the southwest corner of the township and Bird or Oiseau river, crosses it from east to west in the southern third of the township. A small quantity of hay may be cut at the mouth of the river. The surface of the country is rough, broken by rocky ridges. Between these in the northwestern part of the township there are spruce and tamarack muskegs. In other parts of the township the wood is mostly poplar and birch. There is everywhere dense scrub of maple, hazel and willow, and along the creeks, which are very small, alder swamps. There might be some homesteads located here, but none would be very large on account of the rocky ridges. The water is everywhere fresh and the climate good. About ten years ago there was a rush of gold seekers to this part of the country, and there is much evidence of the claims which were staked out there still to be found. Game consists of moose, deer, bear and furbearing animals. Geese and ducks are plentiful in season. Wolves, large and small are also found.—*Geo. H. Watt, D.L.S., 1907.*

Range 14.

6.—The soil in this township is mostly black loam, but as the township is nearly all spruce and tamarack swamps, the soil is only fourth class. The whole of the township is covered with bush consisting principally of spruce and tamarack from three to nine inches in diameter, equally distributed throughout the township. There is very little hay to be found and no water-powers, stone quarries, coal or lignite veins. The water is all of first class quality and can be had in any quantity all over the township at any time of the year. There are two small lakes on the north boundary of section 20 and one large lake on the north boundary entering into township 7. Fuel is very plentiful and either spruce or tamarack can be had in all parts of the township. Moose and black bear are very plentiful all through this section of country. The Dawson road leading to Ste. Anne, a station on the Canadian Northern railway, passes through the southern portion of township 7, range 14, in a northerly direction.—*John Molloy, D.L.S., 1906.*

7.—The soil in this township is mostly black loam or clay, but on account of its being nearly all a spruce and tamarack swamp, the greater part of which is covered with water, the land is useless for farming purposes. The whole of the township is covered with heavy bush, mostly spruce and tamarack, equally distributed, and averaging about seven inches in diameter. There is little or no hay to be found except along Birch river, which flows through the western part of the township in a northerly direction. All the water throughout the township is of first class quality, and can be had in any part at any time of the year without digging. There are no water powers, stone quarries, coal or lignite veins to be found. Wood is very plentiful, and can be had in large quantities all through the district. Moose and black bear

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Range 14—Continued.

are about the only game found. The Dawson road passes through the southern part of the township and runs to Ste. Anne, a station on the Canadian Northern railway, where there are churches, stores, a post office, schools, &c.—*John Molloy, D.L.S., 1906.*

8. There is very little land in this township fit for farming or grazing purposes, as it consists principally of spruce and tamarack swamp, and parts of it are very stony. The soil in the swamps is nearly all black or sandy loam. Nearly all of the township is thickly timbered, with principally spruce and tamarack, with some cedar and poplar about equally distributed, and ranging in diameter from four to ten inches. All the water to be found is of first class quality, and can be had in almost any part of the township at any time of the year without digging. Birch river, a stream about fifty feet wide, enters the township in section 1, and runs in a westerly direction through sections 1, 2, 3 and 4. Fuel is very plentiful all through this section of country, consisting chiefly of spruce and tamarack. There are no stone quarries, coal or lignite veins to be found. The climate is the general Manitoba climate, without any indication of summer frosts. Moose, caribou and black bear are very plentiful. There are no trails of any kind leading through the township, but the Dawson road running from the village of Ste. Anne, passes about four miles to the south, running to the eastern boundary of the province.—*John Molloy, D.L.S., 1907.*

12.—(*Base line*).—All the north boundary of this township is rough, rocky country, interspersed with muskegs. The surface has been swept by fire and is now covered with dead, standing and fallen timber and small green pitch pine. Whiteshell river crosses the north boundary of section 36. South of the line it expands into a lake about two miles wide, which extends into range 15. There are no water-powers in this township.—*B. J. Saunders, D.L.S., 1906.*

13.—This township may be reached by canoe from Lac du Bonnet via (1) Winnipeg river, (2) Whiteshell river and little Rennie river. The township is, as a whole, unfit for settlement, as the greater part has been burned over, and only remnants of the timbered area remain in isolated places. The surface is a succession of rocky ridges up to one hundred feet in height, some rising perpendicularly for fifty feet. Along the northern boundary there is some fairly level land heavily timbered with poplar, jackpine and spruce. Along both Whiteshell and Little Rennie rivers considerable areas of hay lands exist, but I believe in years of high water on Winnipeg river a certain amount is inundated. In the rivers are found jackfish, whitefish, sturgeon and pickerel, all of which are plentiful. Water is everywhere and fresh. There are no economic minerals, stone quarries or valuable water-powers that I know of. Moose, deer, bear, caribou, lynx and wolves are found.—*Geo. H. Watt, D.L.S., 1907.*

15.—This township was reached from township 15, range 15, by travelling over the ice of lake No. 3 and across Winnipeg river immediately above Pointe du Bois falls. The only good soil in this township occurs in small patches between the rocky ridges in the north half of the township, and this is not suited for agricultural purposes. A great deal of the west half of the township is swamp and muskeg. The surface is covered with jackpine, spruce, tamarack, poplar, birch and balsam. The swamps are wooded with spruce and tamarack from one to eight inches in diameter, and the ridges with jackpine, spruce, poplar, birch and balsam from three to twelve inches, but no timber suitable for lumbering purposes is found. No hay is found. Fresh water is abundant in the marshes, lakes and swamps. Winnipeg river runs southerly through the eastern tier of sections, the shores are high and rocky, and the land is not liable to be flooded. Pointe du Bois falls are in the centre of section

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 14—Continued.

36. Here the corporation of the city of Winnipeg is developing power. By using the rapids below the falls and by the construction of a dam, the effective head will be forty-five feet and the proposed development is 40,000 horsepower. At the time of survey (March), a small camp had been erected at the site and a portion of the land cleared. Slave falls are situated in the southwest corner of section 12. Here the river passes between two rocks, and is less than 300 feet wide. A considerable amount of power could easily be developed here by the construction of a dam. The climate at the time of the survey was the ordinary winter weather of Manitoba. Fuel is everywhere abundant. No stone quarries nor minerals were found. Game consists of moose and caribou.—*J. L. R. Parsons, 1907.*

16.—The north boundary of township 16, range 14, runs through rock, broken by muskeg. The surface is rolling and is covered chiefly with poplar, spruce and pitch-pine, averaging about eight inches in diameter. The country is entirely unfitted for agriculture. Winnipeg river flows through the southeast corner of the township. This part of the river is a succession of falls and rapids, rendering it particularly suited for the development of power.—*B. J. Saunders, D.L.S., 1906.*

16. This township was reached from Lac du Bonnet station on the Canadian Pacific railway by travelling on the ice across Lac du Bonnet to the mouth of Oiseau river, thence up the river for two miles; from there by my own trail eastward to the northwest corner of the township. It is a good winter trail. Practically no soil occurs in the township. The swamps and muskegs being rock-bound, cannot be drained, and therefore are not suitable for agricultural purposes. The greater part of the township is composed of rocky ridges. The surface is covered with jackpine, spruce, tamarack, poplar and birch. The swamps are wooded with spruce and tamarack from one to eight inches in diameter, the ridges with jackpine of a similar size, and scattered clumps of poplar and birch from three to ten inches in diameter. Much windfall and fire-killed timber occurs, but none suitable for lumbering purposes. No hay is found. Fresh water is abundant in the marshes, lakes and swamps. The Winnipeg river crosses the corner of the township in sections 12, 1 and 2. This part of the river is in the form of a lake-like expansion, with numerous islands and high rocky shores. The land is not liable to flooding to any extent. Contours have been taken, however, to determine the flooding areas by the corporation of the city of Winnipeg, in connection with the power development at Pointe du Bois falls in section 36, township 15, range 14. The weather during the survey (January) was the usual winter weather of Manitoba, the lowest point reached by the thermometer being 53 degrees. Fuel is everywhere available in the form of windfall, dead and fire-killed trees. No coal was found. Rock 'in place' is everywhere to be found, but no quarry stone nor minerals were observed. Moose, lynx and mink are the only game.—*J. L. R. Parsons, D.L.S., 1907.*

Range 15.

1. The soil in this township would nearly all rank as second class, being a black or sandy loam of good depth. The whole of the township is heavily timbered, with the exception of parts of sections 29, 30, 31 and 32. There is a large, open muskeg in these sections running in a northeasterly direction, with an average depth of water of about two feet. The soil would all be suitable for farming purposes when cleared of the timber. The timber is about equally distributed throughout the township, and is of all sizes, from five to fifteen inches in diameter. Poplar, spruce and tamarack are about the only kinds of timber to be found, although there is some small birch.

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 15—Continued.

All the water is of first class quality, and can be had in almost any part of the township by digging a few feet. There are no creeks or streams to be found. The land is not liable to be flooded. The climate is the general Manitoba climate, with no indication of summer frosts. Fuel is very plentiful all through this section of country, consisting principally of spruce, tamarack and poplar. There are no coal or lignite veins, stone quarries or minerals. Moose and jumping deer are about the only kinds of game to be found, and are plentiful. The main line of the Canadian Northern railway crosses the township in a straight line from the northeast corner of section 7 to the northeast corner of section 1. The railway siding, Gravel Pit spur, is just on the east boundary of section 12, where there is a section house. The town of Sprague, where there is a station, store, postoffice, school, &c., is about three miles west of this township.—*John Molloy, D.L.S., 1907.*

12. (*Base line.*)—The north boundary of this township is rough, rocky country, interspersed with muskeg. The surface is covered, for the most part, with small pitchpine, poplar, willow, spruce and tamarack, but near the lake there is some poplar eight to fourteen inches in diameter. There are two lakes in the northwest corner of the township, which are expansions of Whiteshell river, flowing northwesterly through this township. Between these two lakes are two falls about five feet in height, and north of the base line there are rapids.—*B. J. Saunders, D.L.S., 1906.*

15. This township was reached by my own trail southerly through the centre of township 16, range 15. There is very little good soil in the township, the greater part being composed of rocky ridges. Between these ridges are swamps and muskegs in which the soil is chiefly black loam on a clay subsoil. There is no farm land. The surface is well wooded, being covered with jackpine, spruce, tamarack, poplar and birch. The swamps are wooded with spruce and tamarack from one to eight inches in diameter; the ridges with jackpine and scattered poplar, birch and balsam from three to ten inches in diameter. The shores of the neighbouring lakes usually support timber of larger and better quality, but no timber suitable for lumbering purposes is found. There is no hay in this locality. Fresh water is everywhere obtainable in the swamps, muskegs and numerous lakes. Winnipeg river flows through the west sides of sections 31, 30 and 19. The west boundary of section 19 crosses Eightfoot falls. Here the river passes between two high rocks, and a considerable amount of power could be easily developed by a dam which would increase the head to fifteen or twenty feet. The climate is the ordinary weather of Manitoba. Fuel is abundant in the form of windfall, dead and fire-killed trees, but no coal was found. Neither stone quarries nor minerals were observed. Moose, caribou, lynx, mink and fisher are the only game.—*J. L. R. Parsons, D.L.S., 1907.*

16. This township was reached by way of Mr. B. J. Saunders' trail along the north boundary of township 16, range 14, thence over the ice of lake Saunders. This is a good winter trail. There is only a small proportion of soil in the township, the greater part being composed of rocky ridges. Between these ridges are swamps and muskegs in which the soil is chiefly black loam on a clay subsoil. The surface is covered with jackpine, spruce, tamarack, poplar and birch. The swamps are wooded with spruce and tamarack from one to eight inches in diameter. The ridges with jackpine of similar dimensions, and with scattered clumps of poplar and birch from three to ten inches in diameter. The land along the right bank of Winnipeg river supports a good growth of poplar, spruce and birch from four to twelve inches in diameter, but no timber suitable for lumbering purposes occurs. No hay is found

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TOWNSHIPS EAST OF THE PRINCIPAL MERIDIAN.

Range 15—Continued.

in this township. Fresh water is abundant in the marshes, swamps and creeks. Winnipeg river crosses the township almost diagonally from northeast to southwest, where it takes the form of several lake-like expansions containing a number of islands. Lamprey falls occurs in section 23. The descent is about twelve feet but it is not well suited for the development of power, since there are only short rapids above and below the falls, and the present head may be decreased when the dam at Pointe du Bois is completed. No other water-powers occur. The weather during the survey (February) was the usual winter weather of Manitoba. Fuel is everywhere available in the form of windfall, dead and fire-killed trees. No coal was found. Rock in place is everywhere exposed on the surface, but no quarry stone nor minerals were found. Moose, caribou, lynx and mink are the only game.—*J. L. R. Parsons, D.L.S., 1907.*

16. The country along the north boundary of township 16, range 15, is mostly rock, broken by some muskeg and low ground, and is quite unsuitable for agriculture. The surface is rolling and is covered chiefly with poplar, pitch pine, spruce and birch, averaging from six to eight inches in diameter. There is a lake in the northwest corner of the township. Winnipeg river enters at the east of the township, about one and one-half miles south of the north boundary, and flowing southwest leaves the township at the southwest corner. There is a large fall about the centre of the township, from which considerable power could be developed.—*B. J. Saunders, D.L.S., 1906.*

Range 16.

16. The country along the north boundary of township 16, range 16, is rock, broken by muskeg and lakes, and is not suitable for agriculture. The surface is rolling, and is covered with small pitchpine, spruce, poplar and balsam of no marketable value. Winnipeg river flows across the township from east to west, leaving the township about one and one-half miles south of the north boundary. It is not so suitable here for the development of power as it is farther west.—*B. J. Saunders, D.L.S., 1907.*

Range 17.

16. The country along the north boundary of township 16, range 17, is mostly rock, broken by numerous lakes, and is totally unfit for agriculture. The surface is hilly and rises in places seventy-five feet above the lakes. The north boundary of sections 33, 24, 35 and 36 crosses five lakes, a large lake being situated in the northeast corner. The timber is mostly small, but there is some poplar, birch, tamarack, spruce and pitchpine, averaging nine inches in diameter. Winnipeg river flows across the southwest corner of the township. A few miles farther southeast along the river, there are some rapids from which power could be developed.—*B. J. Saunders, D.L.S., 1906.*

TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 1.

26. On the east boundary of sections 1, 12, 13, 25 and 36 of this township the line passes through small poplar and jackpine bush. The east boundary of section 24 falls in a tamarack swamp, which extends for a considerable distance to the west of the line, but only about half a mile to the east of the line. The soil is a shallow layer of clay and gravel on limestone, except in the swamp mentioned above, where black loam occurs.—*Wm. Christie, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 1—Continued.

27. On the east boundary of section 12 and the south of section 13 of this township the line continues through small poplar and jackpine. The soil in these sections is black loam about two inches deep on limestone. In the north half of section 13, sections 24, 25 and 36 the line passes through a large muskeg and tamarack swamp, which extends on the west to Fisher river a distance of about three and one-half miles. To the east of the line it extends in a southeasterly direction for several miles. When we came to the muskeg (on November 9) it was too soft for a man to walk across. It took the whole party a little more than a week to cut a road and move camp around it. Fortunately by the time we got the camp around to the north side the muskeg was frozen sufficiently hard to allow a man to walk over it, and we were able to get the line across without difficulty.—*Wm. Christie, D.L.S., 1907.*

28. The muskeg mentioned in township 27 extends into section 1 of this township. Fisher river crosses the line on the east boundary of section 24. The portion of the township south of the river is covered with small poplar, willow and spruce with some swamps and hay marshes. North of the river the timber is larger, poplar up to ten inches in diameter occurring. Some large marshes are also crossed north of the river in sections 24, 25 and 36. In this township the line also crosses Fisher river, Indian reserve (No. 44). I connected my survey with that of the reserve. The country here appears well adapted to stock raising as abundance of hay can usually be obtained from the marshes. Last year, however, most of the hay land was under water. It would be an easy matter, however, to drain these swamps into Fisher river.—*Wm. Christie, D.L.S., 1907.*

28. (*North outline.*)—In this township the land is gently undulating, consisting of low ridges covered with poplar up to six inches in diameter, alternating with tamarack swamps, muskegs and hay marshes. A small lake occurs in section 5, township 29, range 1. The soil is chiefly black loam on clay subsoil, but gravel occurs on the north boundary of section 35.—*Wm. Christie, D.L.S., 1907.*

Range 2.

28. This township consists of a series of low, flat ridges, covered with poplar and spruce, with here and there a few birch and jackpine, alternating with tamarack swamps, marshes and hay lands. A small lake, which I named Oolonsay, occurs in sections 33 and 32. The soil is chiefly black loam on clay subsoil, but limestone occurs on the north boundary of section 34, and drift boulders are quite plentiful on all the dry land.—*Wm. Christie, D.L.S., 1907.*

Range 3.

28. The genera of flat ridges timbered, separated by t sections 36 and 35. north. This stream is a strip of close to the river be —*Wm. Christie, D.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 4.

18. As Oak Point, a station on the Canadian Northern railway, is situated in this township, we travelled over this country by fair wagon roads during nearly all season. All homesteads are taken by Icelanders, an intelligent and industrious people. The soil is of good quality being generally of black loam with a stone and gravel subsoil. Although this township is settled for twenty years, the owners of lands do not seem to appreciate the quality of the soil for farming. In its present condition, the land is better suited for cattle raising and dairying. The surface is level and is covered with scrub, patches of poplar, a few oak, sloughs, hay marshes and prairie where they have always plenty of good hay, even in wet seasons. All valuable timber has been cut for building and fencing. Poplar, the average of which is of poor quality, is the only fuel. Good water is plentiful and can be obtained easily by digging wells without great expense. Prairie chicken is the only game in this township, but ducks are plentiful around lake Manitoba. No mineral or waterpower was found.—*C. E. Bourgault, D.L.S., 1907. . .*

22. The general aspect of this township is swampy and at the time of survey (September) nearly all covered with water. In wet seasons settlers cannot depend on the swamps to obtain a supply of hay to feed their cattle during the winter. There are some high ridges where the soil is composed of a few inches of black loam with sand and gravel subsoil, but they are covered with poplar and windfall. Moose and deer are quite numerous.—*C. E. Bourgault, D.L.S., 1907.*

28. (*North outline*).—This township is similar to those in ranges 2 and 3, consisting of low ridges, covered with poplar, spruce and tamarack, alternating with tamarack swamps, muskegs and hay marshes. The proportion of dry land is somewhat greater, however, and the timber somewhat larger than in range 3, spruce and poplar twelve inches in diameter occurring. A small lake occurs in section 32. The soil is chiefly black loam on clay subsoil but gravel occurs in places.—*Wm. Christie, D.L.S., 1907.*

Range 5.

14. (*West part*).—The fractional township is all flooded with water and covered with reeds. However, in dry seasons hay can be cut in sections 6, 7, 16 and 17. The northwest part is covered with reeds and open spaces of water. Ducks, geese and muskrats are numerous.—*C. E. Bourgault, D.L.S., 1907.*

15. (*Fractional*).—This fractional township can be best reached by a good graded wagon road from Poplar Point, a station on the Canadian Pacific railway. The land is mostly stony and the soil is not of much depth, with generally a gravel subsoil. The removal of the stones will be expensive; the township at present is better suited for cattle raising than for any other purpose. However, the settlers who have cleared a piece of land have always a good crop of vegetables. As the hay is plentiful and of superior quality, the attention of the settlers is devoted to cattle and horse raising. There is no timber in this township; the only place where the farmers obtain their wood is at St. Laurent, situated twenty miles east. The water when found was fairly good. The settlers, however, now depend on wells or lake Manitoba during the winter for their supply. As there are no streams there can be no water powers. No stone quarries, nor minerals of value were noticed. Game, consisting of ducks and geese, is plentiful.—*C. E. Bourgault, D.L.S., 1907.*

21. Access to this township is very easy by wagon roads from Oak Point. In wet seasons these roads are nearly impassable, as no improvements have been made

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 5—Continued.

on them. The soil is of good quality, but is generally covered with marsh or timber, so that it is not very suitable for grain growing. Cattle raising is followed exclusively by the settlers, and for this the township is well adapted, though grain could be grown in some sections. The woods are poplar of fair size and distributed over each section. Swan creek enters the township in section 6, running southeasterly. The climate is similar to that of central Manitoba. Good water is usually found in the swamps, and is generally easily obtained by digging wells. No stone quarries, coal or minerals were observed. Game of all kinds is scarce.—*C. E. Bourgault, D.L.S., 1907.*

22. The general aspect of this township is swampy and at the time of survey (September) nearly all covered with water. In wet seasons settlers cannot depend on the swamps to obtain a supply of hay to feed their cattle during the winter. There are some high ridges where the soil is composed of a few inches of black loam with sand and gravel subsoil, but they are covered with poplar and windfall. Moose and deer are quite numerous.—*C. E. Bourgault, D.L.S., 1907.*

28. (*North outline*).—This township is gently undulating, consisting of low ridges, timbered with poplar, spruce, tamarack and jackpine, separated by tamarack swamps, muskegs and hay marshes. The greater part of the timber has been killed by fires. The soil is chiefly a shallow layer of black loam on sand or gravel. I had to open the line twice across this range to connect with the northeast corner of township 28, range 6.—*Wm. Christie, D.L.S., 1907.*

Range 6.

14. Access to this township is easy by roads from High Bluff, a station on the Canadian Pacific railway. The north part is watered by lake Manitoba, while the south part is covered with long reeds and open spaces of water, so the land may be classified as swamp land, unfit for agricultural purpose. I must mention that hay is not plentiful, but in dry seasons sections 3, 2 and parts of sections 10, 11, 12 and 1, may be classified as hay land. There is only one farmer in section 6, where there is some cultivated land. Sometimes in the spring, the water of lake Manitoba rushes over the sandy beach and spreads over this township and on the north part of township 13, range 6. It is for that reason that the timber, like oak and cottonwood which are growing on this beach, should not be cut. I remark that where the timber has been cut, the sand on the beach is washed out by the waves of lake Manitoba during a great northwest wind storm, and water and ice come in and spread over township 13, where there is first class farming land, and this makes very great damage. This sandy ridge is about four chains wide, from four to eight feet high and contains the best and finest sand for masonry and cement brick. No fuel occurs in this township. Game is plentiful, consisting of ducks and geese.—*C. E. Bourgault, D.L.S., 1907.*

22. From Oak Point, a station on the Canadian Northern railway, there is a good wagon road to Deerhorne. From there I cut a trail to section 28, township 22, range 6. Access to this township is also easy by another road cut by settlers, last summer in sections 3, 4, 9, 16, 21, and 28. The surface is generally timbered with poplar of eight to eighteen inches in diameter and scattered big spruce and willow, interspersed with hay marshes and lakes. Hay can be procured in many of the marshes, but in a wet season like last summer few if any of the marshes can be entered. Settlers had a very hard time to cut hay for their own cattle, some of them were

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 6—Continued.

obliged to cut hay in water, and haul it with a sleigh and a pair of oxen on a high place to dry. Some of them were forced to sell their cows or send them away for winter. July, August and September were very wet. The soil is of good quality, black loam, clay and sand subsoil, but the expenses incurred in clearing the land from green and dry wood will be too expensive now for farming. For this reason this township is better suited for stock raising than for anything else. The water is fresh and during all summer about half of the surface is flooded to the depth of from four inches to two feet. The surface is level. There are no streams and no water-powers. A few jumping deer were noticed. No minerals of any value were found.—*C. E. Bourgault, D.L.S., 1907.*

Range 7.

22. Coming into the township by the colonization road to Scotch Bay from Oak Point on the Canadian Northern railway I was able to get into the south part by settlers' trails and those of the Indians, none of which were in good condition. To get farther north I was forced to make a trail for myself. The whole country is gently rolling, wooded with poplar, chiefly, on the ridges and having hay meadows or sloughs in the depressions.. There was some spruce also, but no marketable timber. To the north the country had been more burned in places and was slightly more rolling though by no means hilly. Game was abundant. No minerals of economic value were seen, nor is there any water-power in the township. Though many of the quarter sections are taken up only a few were occupied at the time of survey (August) as nearly everyone was waiting till the township would be subdivided. This township has long formed a hunting ground for the Indians of the adjacent reserve and many of their old camps were seen. An old telegraph line runs diagonally across the township from northwest to southeast. In some places it can scarcely be seen. I think the township will make an excellent mixed farming country.—*Geo. A. Grover, D.L.S., 1906.*

Range 8.

22. I think most of the marshes in this township will in time dry up, if not altogether, at least to a considerable extent. At present they are difficult to survey owing to the lack of well defined shores. The township has good soil. The surface is rolling, covered in the northern part by poplar bush with considerable spruce in some places. Near the Indian reserve the country is much broken by immense hay meadows and marshes, on the higher places only scrub is growing, brulé and deadfall showing the work of fires. Settlers seem to be coming into this country rapidly. *Geo. A. Grover, D.L.S., 1906.*

Range 10.

21. Along lake Manitoba this township is open and marshy and more remote from the lake it is densely timbered with poplar and willow. The chief industries are stock raising and fishing. Much hay can be procured in the sloughs and marshes. Moose and deer are abundant. Only a small percentage of the land is yet broken, barely enough to produce vegetables.—*Geo. McMillan, D.L.S., 1907.*

25. (Fractional.)—This township consists of a small strip of land in the west part of sections 6, 19, 30 and 31 and Richard point which occupies part of sections 1, 2 and 12. There is a small area of good land in sections 30 and 31 and also on Richard point. There is one settler at each of these places. Reed island is only a group of low sand bars covered along the edges with long reeds and small willows.

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

As there was no definite shore I did not traverse them. There are no water-powers, no quarries and no minerals of any description.—*Paul T. C. Dumais, D.L.S., 1906.*

26. (Fractional.)—This township is only a strip of land composed of the west parts of sections 6, 7, 18 and 19. There are some good patches of land in sections 6 and 7, but the balance is all swampy and is covered with long reeds and small willows. There is a bluff of poplar on section 7 averaging twelve inches in diameter, some patches of prairie on section 6, and a few hay sloughs. There are no water-powers, no quarries and no minerals of any description.—*Paul T. C. Dumais, D.L.S., 1906.*

28 & 29. These townships were reached from Oak Point by the winter trail to Fairford postoffice. The soil is a black loam from one to five inches deep on a clay subsoil. The land is covered with small poplar, willow and a little spruce and oak all under ten inches in diameter, but no timber suitable for lumbering purposes is found. A large quantity of hay grows in the marshes. Water is abundant in lake Manitoba and in the marshes but no water-powers occur. The climate is moderate. Fire-killed trees furnish a good supply of fuel. Limestone is found close to the surface and there is said to be a large deposit of good quality adjoining the shore of lake Manitoba. No minerals were found. Moose and elk were the only game seen.—*J. L. R. Parsons, D.L.S., 1907.*

32. Across this township the line passes mostly through dry country covered with woods of a varied character, consisting of small poplar, alternating with patches of spruce, tamarack or jackpine. In the west half of the range much of the woods have been destroyed by fire, and a growth of small scrub has sprung up. The land is about level, and the soil in the eastern portion of the range is black loam from four to twelve inches in depth on clay subsoil. On the north boundaries of sections 32 and 31 it is mostly gravel.—*Wm. Christie, D.L.S., 1907.*

25. From Makinak station on the Canadian Northern railway, the shortest route to reach this township is by the graded road going east as far as Ste. Amélie, a distance of fifteen miles, and thence by the old trail to Ebb-and-Flow Lake Indian reserve. From the reserve there is a cart trail going north on the west side of Ebb-and-Flow lake as far as Crane bay on lake Manitoba in section 21 of this township, and at a distance of about twenty-eight miles from the east end of the graded road mentioned above. This township could also be reached in summer by boats that generally run from Oak Point which is on lake Manitoba, and which is the terminus of the Canadian Northern railway branch from Winnipeg. This township is broken on the northwest by Crane bay of lake Manitoba, which partly covers sections 21, 22, 27, 28, 31, 32, 33 and 34. On the east side, sections 12, 13 and 24 are partly covered by lake Manitoba, and on the southwest, Ebb-and-Flow lake with an area of over two square miles extends over parts of sections 5, 6, 7, 8 and 18. The soil is mostly sandy loam with a subsoil of clay, but in some places sand and gravel is found. There are ten Icelandic settlers squatted along Crane bay and lake Manitoba. They cultivate no grain but grow potatoes and all sorts of vegetables. They have good herds of cattle, the country being well adapted for stock raising. The land is good for farming, but where the settlers are located it is so flat that it is liable to be flooded in the rainy seasons. Along the lake and bays are large muskegs covered by reeds eight to ten feet long. There are numerous hay sloughs which grow quantities of good hay. The south part of this township is heavily timbered in places with poplar up to fifteen inches in diameter. There is also some scattered spruce and small oak which may be used for building and fencing. A large part of this township has been fire swept and the fire-killed poplar will furnish any quantity of fuel. The country is very level all over

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 10—Continued.

this township. There are no water-powers, no quarries and no minerals of any description in this township. Moose, elk and jumping deer are numerous. There are also great numbers of rabbits and a few partridges. Pike and whitefish are caught in great numbers in lake Manitoba.—*Paul T. C. Dumais, 1906.*

26. This fractional township consists of sections 1, 2, 12 and part of sections 3, 4, 6, 11, 13 and 14. It is broken by lake Manitoba and by five other lakes, sections 1 and 12 being the only ones which are unbroken. There are some good patches of land in sections 1, 2, 3, 4 and 12, but the remainder is all swamp and muskeg covered with long reeds and small willows. The soil is mostly sand, clay and gravel covered with four to six inches of black loam. Parts of sections 1, 2 and 12 are well timbered with poplar up to twelve inches in diameter. There is also some small oak and birch and a great deal of willow scrub. Cherry island on the north boundary of this township, is only a swamp sand bar covered with long reeds and willows along the shore. There are no water powers, no quarries and no minerals of any description.—*Paul T. C. Dumais, D.L.S., 1906.*

28. In this township the line crosses Peonan point, a long narrow peninsula extending from the north end of lake Manitoba to about nine miles south of this line. It has a width on the line of about three miles, the east shore being reached in section 35, and the west shore in section 32. Along each shore is a strip, about half a mile in width, of wet, marshy land, part of which is hay land, but the greater part of which is covered with tall reeds and rushes. The interior of the point is mostly wooded with poplar; but many marshes and muskegs occur. The soil is chiefly black loam on clay subsoil. The south end of this point is very low and marshy.—*Wm. Christie, D.L.S., 1907.*

32. The eastern half of this township is similar to range 10, being covered with poplar and spruce, much of which has been destroyed by fire, and having numerous sloughs and marshes. A small creek, known as Powderhorn creek, crosses the line in section 34. In the west half of the range the line crosses extensive muskegs with bluffs of tamarack and willow. A very reedy lake, known as Basket lake, lies about half a mile to the south of the line, partly in range 11 and partly in range 12. This lake is about three miles in length from east to west and from two to three miles in width. Basket creek flows from this lake to lake Manitoba. This creek has a fairly rapid current, which would appear to indicate that Basket lake is at a considerably higher level than lake Manitoba, and points to the possibility of much of the swamp land being drained. The soil is black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

Range 12.

26. The centre of this township is situated at a distance of twenty-seven miles east of East Bay postoffice, near lake Dauphin, and is about forty-nine miles from Makinak station on the Canadian Northern railway. From this last place to East Bay there is a well graded road. To go farther east there is a wood trail for four miles, and from there I opened a winter trail through townships 26, ranges 15, 14, 13 and 12 as far as lake Manitoba. The soil in this township consists of a black loam four to ten inches in depth, with a subsoil composed chiefly of clay, with some gravel and sand in places, especially on the west half. A large part of the east half of the township is covered by lake Manitoba. Large muskegs border the lake extending in some places for over half a mile from the shore. Long reeds and small willows grow in these muskegs and in most of the large sloughs which are numerous

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 12—Continued.

all over this township. There are also many hay sloughs where large quantities of good hay can be made in dry seasons, but this country being very flat there would be some difficulty in making hay in a wet season. There is no valuable timber in this township. The best of what there is, is good only for small buildings, fencing and fuel. There are no water-powers, quarries or minerals, but it is a good country for game. Moose, elk and jumping deer were numerous at the time of the survey. Rabbits are in abundance and there are plenty of pike and whitefish in lake Manitoba.—*Paul T. C. Dumais, D.L.S., 1906.*

28. The greater part of the township falls in lake Manitoba, the west shore of the lake being reached in section 32. In section 31 the line passes through country similar to that in range 13. Along the shore of the lake is a strip of low marshy land of varying width. The soil is black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

32. In this township the line crosses a series of large muskegs and swamps with low ridges covered with small poplar and willow. The soil is black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

Range 13.

26. From Makinak station on the Canadian Northern railway, there is a good road to East Bay and lake Dauphin, a distance of twenty-two miles. From there, for about four miles due east, is a bush trail but for the remaining ten miles to the centre of this township, we had to go through bush, slough and muskeg. The surface is covered with poplar, willow and a few scattered spruce, the poplar measuring up to twelve inches in diameter. The soil is similar to that in township 26, range 14, a mixture of clay, sand and gravel covered by four to six inches of black loam. The country is very level, with many sloughs and muskegs. Green and dry poplar, for fuel and fencing purposes, is plentiful. Tamarack lake (so called by Indians) is over three miles long and extends north and south, partly covering sections 3, 10, 15 and 22. There is no water-power, no quarries and no minerals. Moose, elk and jumping deer are numerous, and the country seems to be overrun with rabbits.—*Paul T. C. Dumais, D.L.S., 1906.*

28. In this township the line crosses much marsh and muskeg but there is a larger proportion of bush than in range 14 and the timber is also larger, poplar up to eight inches in diameter being found. Crane river crosses the line in section 31 flowing north into Crane bay. On both sides of the river is a strip of marshy land and close to the river banks are tall reeds. A lake half a mile in width and surrounded by a reedy marsh is also crossed in section 31. The soil in this range is chiefly black loam on a subsoil of clay.—*Wm. Christie, D.L.S., 1907.*

32. In this township the line passes through low country consisting of low ridges covered with poplar and willow, separating large muskegs and hay sloughs. In sections 36 and 35 the line crosses a bay of lake Manitoba. Boggy creek flows into lake Manitoba from the north in section 35. In section 34 and 33 the line crosses Proulx lake. This lake is about four miles in length from north to south and the greater part of it lies in township 33. The soil in this range is chiefly black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

23. (*Fractional.*)—From Makinak, on the Canadian Northern railway, there is a good road to this township. The soil, which is similar to that in the neighbouring townships, is fairly fit for cultivation, being clay, sand and gravel, covered with

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 13—Continued.

three to six inches of loam. The timber is chiefly fire-killed and standing poplar, with some green bluffs here and there and a second growth of poplar and willows. There are a few hay sloughs throughout the township. There are no water-powers, no quarries and no minerals of any description. Moose, elk and jumping deer are numerous. There are also great numbers of rabbits and a few partridges. Pike and whitefish are very plentiful in lake Manitoba.—*Paul T. C. Dumais, D.L.S., 1906.*

26. From Makinak station on the Canadian Northern railway, there is a good road to East Bay postoffice situated on section 1, township 26, range 16. Thence going east there is a bush trail for about three miles, but from there I had to cut a road as far as range 13. The soil in this township is a mixture of clay, sand and gravel, with four to six inches of black loam on top. There is no prairie, but there are many hay sloughs and muskegs and much swampy land. The remainder of the township is covered with poplar running up to ten inches in diameter, and willow scrub. There is also some small scattered spruce in the north sections. The country is very level, except in the north, where it is gently undulating. Good hay can be made in the numerous sloughs, but it can be cut only in dry seasons. The surface water is generally a little alkaline, but we found good fresh water by digging four or five feet. There were no indications of summer frosts. Green and dry poplar is plentiful all over the township and could be used for fuel, for small buildings and for fencing. There are no water-powers, no quarries and no minerals in this township. Moose, elk and jumping deer were frequently seen during the survey. Rabbits are very numerous.—*Paul T. C. Dumais, D.L.S., 1906.*

28. In this township the line crosses low swampy land partly covered with poplar and willow scrub but chiefly open swamps and patches of prairie. At the time the survey was made (June) owing to the late spring and unusual depth of snow during the previous winter, the land was much wetter than it would be in an ordinary season and much of the land which at that time was under water would on an ordinary year be excellent hay or grazing land. The soil is principally black loam to a depth of from eight to twelve inches on a clay subsoil. In a few places however the subsoil is gravel. This should be an excellent place for stock raising as there is sufficient pasture land and also a supply of hay can be obtained.—*Wm. Christie, D.L.S., 1907.*

32. In this township the line crosses a series of low ridges covered with poplar and willow, separated by large muskegs, swamps and hay marshes. Some brulé is met with on the north boundary of section 33. On the north boundary of section 31 the east shore of lake Manitoba is reached. The north end of the lake extends about a mile north of the line. The soil is black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

Range 15.

10. (*North outline.*)—Spruce Woods timber reserve occupies a part of this township. A great amount of marketable timber has been cut and the township has been overrun by fire, but there is still much timber remaining which will furnish fuel for many years. Transportation of this fuel will be comparatively easy as the Canadian Pacific and Canadian Northern railways pass through this township. The country along the north boundary is wholly unfit for farming. The soil is a poor quality of light sand, where there was not sufficient grass growing to feed my horses. Some fair sized tamarack, mostly dry, was noticed, while scattered spruce and poor poplar extend through the east part. Water is scarce and except what is found in the muskegs,

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 15—Continued.

must be obtained by digging wells. A few jumping deer were the only game seen.—*C. E. Bourgault, D.L.S., 1907.*

32. In this township the western shore of lake Manitoba is crossed on the north boundary of section 35, and Waterhen river is crossed on the north boundaries of sections 33 and 32. Between lake Manitoba and Waterhen river are bluffs of small poplar by patches of prairie and hay marshes. Two small creeks cross the line in section 34. West of Waterhen river are low ridges, covered with brulé, small poplar and willow, separated by tamarack swamps. The soil is black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

Range 16.

10. (*North outline.*)—Spruce Woods timber reserve occupies a part of this township. A great amount of marketable timber has been cut and the township has been overrun by fire, but there is still much timber remaining which will furnish fuel for many years. Transportation of this fuel will be comparatively easy as the Canadian Pacific and the Canadian Northern railways pass through this township. The country along the north boundary is wholly unfit for farming. The west part of the township is covered with muskeg, thick willow and scrub. The east part is also covered by spruce on sand hills separated by small marshes where there is no hay. The soil is a poor quality of light sand, where there was not sufficient grass growing to feed my horses. Some fair sized tamarack mostly dry was noticed, while scattered spruce and poor poplar extend through the east part. Water is scarce and except what we found in the muskegs, must be obtained by digging wells. A few jumping deer were the only game seen.—*C. E. Bourgault, D.L.S., 1907.*

32. In this township the greater part of the line falls in a bay of lake Winnipegosis, the eastern shore of which crosses in section 34 and the western shore in section 31. The shores of lake Winnipegosis are here very low and marshy, tall reeds growing in the water along the shore. On the north boundary of sections 36 and part of 35 the line passes through brulé with small poplar and jackpine, and tamarack swamps. The soil is black loam on clay subsoil. Some settlers have already located along the shore of the lake in townships 31 and 32. They engage in ranching and fishing.—*Wm. Christie, D.L.S., 1907.*

51. The trail from Battleford to Birch lake passes through section 25 and 35 of this township and forms the best route for reaching it, as it is generally in good condition. There are some hills to be crossed, but they present no special difficulty. One creek, which has to be crossed, might cause trouble in a wet season. The soil of this township consists of a thin layer of black mould with a subsoil generally of clay loam or sandy clay. In many places stones occur but not so thickly as to interfere with agricultural operations. About half of the township has first class soil, the remainder being second class. Practically the whole is covered with either light or heavy scrub poplar and willow. A great many small open spaces occur especially in the northwest portion of the township, and also near the shores of MacLeod lake. About eighteen per cent of the surface is water, ten per cent open, and the remainder scrub poplar and willow interspersed with scattered poplar and balm of Gilead, averaging eight inches in diameter. Sections 2, 3, 4, 5 and 6 are rolling while the remainder is gently rolling country. Poplar and balm of Gilead averaging about eight inches are scattered all over the township. A small amount of spruce is found near the small lakes in sections 5 and 6. These trees average about eight or nine

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 16—Continued.

inches in diameter, the largest being about fourteen inches. Altogether about one hundred thousand feet of lumber could be cut. Grass grows luxuriantly in all the open places throughout the township. Scattered over the township are a few very small hay meadows. The upland grass should also make good hay. This township is well supplied with water. Birch lake occupies about half of sections 25 and 36, and along the south outline of the township is a string of lakes connected by small creeks. Several sloughs are to be found throughout the township all of which contain good drinking water. MacLeod lake, a rather shallow lake of 2,000 acres area, occupies parts of sections 10, 11, 14, 15, 16, 22 and 23. The water is slightly brackish, and the supply is sufficient and permanent. No land is liable to be flooded to any serious extent. The small streams along the south outline average about eight feet wide and six inches deep with an average current of three miles an hour. No water-power could be generated. The climate was cool, the days being moderately warm. Considerable rain was experienced, but no summer frosts occurred. Fuel in the shape of poplar can readily be procured throughout the township. No coal or lignite veins were seen. No stone in place was observed, although loose stones for building purposes are abundant. No minerals of economic value were found. Game seemed to be rather scarce as the Indians have for a long time made this district their hunting ground. An occasional prairie chicken or partridge was seen, while duck of various kinds were very plentiful. Trails of red deer and moose were noticed. Rabbits and other small game did not appear to exist. Elk had evidently lived here formerly but no recent traces of them were noticed. Birch lake and the series of small lakes mentioned contain an enormous quantity of fish, those noticed being jackfish, whitefish, sucker and pickerel.—*H. S. Holcroft, D.L.S., 1907.*

Range 17.

32. In this township the line passes over a series of low flat ridges, covered with brulé, a growth of small poplar and a few jackpine, separated by muskegs and hay marshes. The eastern shore of lake Winnipegosis proper is reached in section 33. A small lake is also crossed in section 36. The soil is black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

Range 18.

32. In this township the line crosses Red Deer point, a long narrow peninsula extending about eighteen miles north of the line into lake Winnipegosis. On this point the line passes through poplar and spruce up to fourteen inches in diameter. Most of the spruce of any value however has already been removed. There are also many hay marshes, and a small lake is crossed in section 32. The line crosses Fuller's bay on the north boundary of sections 33 and 34 and reaches the western shore of lake Winnipegosis proper on the north boundary of section 35. The soil is black loam on clay subsoil.—*Wm. Christie, D.L.S., 1907.*

Range 19.

36. The greater part of the line in this township falls in Sagenace bay, a portion of lake Winnipegosis separated from the main lake by Red Deer point. Along the shore of the bay is a strip of hay marsh. Back of this is a narrow strip of heavy poplar bush and back of this again is small poplar and willow with hay meadows and sloughs.—*Wm. Christie, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 25.

41. The soil in the southwest corner is good and suitable for farming but the greater part of the rest is muskeg or swamp and very wet and is of very little use. The surface is level and covered with thick woods. The only timber of any value is at the southwest corner. It is chiefly poplar and spruce from eight to sixteen inches in diameter. Spruce, tamarack and willow are found in the muskegs. Some balsam and birch were also seen. Hay is very scarce. The water is fresh and very plentiful and the supply is permanent. Only small streams are found. The land is flooded to a great extent now (May), a foot or more deep. There are no water-powers. The climate was very disagreeable. Cold cloudy weather with alternate snow, sleet and rain storms occurred in the latter half of May with as much as five feet of snow on the ground in places in the hills, while two feet was common on the level in the big timber. Frosts were experienced. Wood is the only fuel but it is plentiful almost everywhere. No coal, stone quarries or minerals were found. Moose was the only game seen, but they are plentiful.—*W. G. McFarlane, D.L.S., 1907.*

Range 26.

41. The soil is good for farming in the southerly part but is more sandy and very stony towards the north. There is also considerable muskeg towards the northeast. The surface is all heavily wooded, poplar and spruce to the south and some small poplar, birch and jackpine towards the north, with spruce and tamarack in muskeg on the east. The only timber of any value is in the southerly part or on the hills to the west. It is chiefly poplar and spruce from eighteen to twenty-four inches in diameter with some balsam and birch from six to twelve inches. There is a fair amount of it but it will be hard to get out as no waterways are available and the surface is very hilly. Some birch, balsam and alder were also found. Hay is very scarce. The water supply is very abundant and fresh, no alkali being found. The streams are small but there are quite a number of them. The land is not liable to be flooded except in the muskeg at the easterly side. There are no water-powers. The climate was very disagreeable. Cold cloudy weather with alternate snow, sleet and rain storms occurred in the latter half of May with as much as five feet of snow on the ground in places in the hills, while two feet was common on the level in the big timber. Frosts were experienced. Wood is the only fuel but it is plentiful almost everywhere. No coal, stone quarries or minerals of any kind were found. The only game seen was moose. The westerly part of the township is up in the Porcupine Hills and is very high and rough.—*W. G. McFarlane, D.L.S., 1907.*

42. The route followed is a trail which crosses the railway north of Novra and runs north along the foot of the hills. It was in general good but very stony in places. The soil at the south and north sides of the township is a black loam and clay, is very good for farming and is well watered, but in the centre it is sandy on the ridges and there is considerable swamp and muskeg. The surface is rolling at the south and north sides, hilly at the west and flat at the centre of the east side. It is almost all thickly wooded. A little brulé is found just south of Bell river and also some at the north side of the township. The only timber of value is found on the hills to the west and across the centre of the township. It is chiefly poplar and spruce eight to twenty-four inches in diameter. Jackpine birch and poplar are found at the south and north sides and some tamarack at the east. Hay is very scarce. The water is fresh and abundant and the supply is permanent. Bell river at the south side of the township is a fine stream, especially in the spring when we had great difficulty in crossing it, as the snow was just melting in the hills to the west. It was about five feet deep and running about eight to ten miles an hour carrying down large

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 26—Continued.

trees and roaring like distant thunder. The only part of the township liable to be flooded is the muskeg near the centre of the east side but quite a number of streams run out of it to the railway ditches. Water-power might be developed farther to the west on Bell river but there are no rapids or falls of any height in the part surveyed. The climate was very damp and cool. Considerable rain fell. Frosts were noticed. The only fuel is wood but it is plentiful almost everywhere. No coal, stone quarries or minerals were found. The only game seen was moose, jumping deer and bear.—*W. G. McFarlane, D.L.S., 1907.*

43. The trail runs along the foot of Porcupine hills, west of the Canadian Northern railway. It is good in general but very soft in a few places. The soil is good for farming at the south side, being a good loam and clay subsoil but gets sandy towards the north and is very sandy in some places along jackpine ridges. There is also some muskeg and swamp near Mafeking. The surface is rolling, timbered and scrubby, with some *brulé* at the south side. Timber has been large and plentiful to the west of Mafeking and north to Steeprock river but it is mostly cut over now. Some poplar six to eighteen inches and spruce six to thirty inches is still found, but the timber is mostly second growth poplar, jackpine one to twelve inches, birch, willow and alder. Some tamarack is found in the muskeg. Hay is very scarce. The water is fresh and very plentiful in streams and Steeprock river. This river is a fine stream about one and one-half chains wide four feet deep and has a current of four or five miles an hour. The land is not likely to be flooded. There are no water-powers. The weather was damp and cloudy with considerable rain. Ice was still to be found along some creeks in the middle of June. No hard frosts were noticed. The only fuel is wood, but there is plenty of it everywhere. No coal, stone quarries or minerals were found. Moose and bear were seen.—*W. G. McFarlane, D.L.S., 1907.*

44. The trail runs on at some distance west of the Canadian Northern railway until close to the south boundary, where it goes along the right-of-way through muskeg and is very bad until within about a mile of Rice creek, where it again skirts the hills and is drier and better. The soil at the south side of the township is light at the west, and muskeg and swamp near the railway but it is better towards the north and would make fair farm land. The surface is rather flat and thickly wooded. Some scattered timber is found but in no large blocks. It is spruce six to twenty inches, poplar two to twelve inches, birch, tamarack, willow and alder scrub with considerable jackpine to the southwest. Hay is scarce. Water is fresh and plentiful. Only small streams are found. The land is liable to be flooded several inches deep in places. There are no water-powers. The weather was damp and cloudy with some rain, but was fine and hot at times. No frosts were noticed. The only fuel is wood but it is plentiful everywhere. No coal, stone quarries or minerals were found. No game was seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 27.

44. The trail followed runs along the foot of Porcupine hills and crosses the railway four times. It was fairly good but had a number of soft holes on it, and many creeks some of which had to be bridged. The soil is of all classes. On the north side of the railway and east of the centre it is mostly muskeg, but there is some good land along the railway in the west half. The southeast corner runs up on the hills and in some places the soil is sandy, while in others it is very heavy clay. The surface north of the railway and for about half a mile south of it, is level or

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Range 27—Continued.

gently rolling. The southeast part is very hilly and rough, being cut up by deep ravines, down one of which Rice creek flows. It is mostly timbered east of the centre. The west part along the Canadian Northern railway has about a section of prairie, and the rest is chiefly scrubby land with considerable windfall to the northeast. The timber is six to ten-inch tamarack and spruce to the north of the railway chiefly, but some six to eight-inch poplar and balsam and a few birch are found. On the south side of the railway there is some jackpine to the east, some six to sixteen-inch spruce and poplar along the face of the hills up to Rice creek. A few eight to twelve-inch birch are also found. Hay is very scarce. The water is all fresh and very plentiful in creeks and muskegs. This creek is a fine stream about one chain wide and from one to two feet deep at low water. The current is about four or five miles an hour. The land to the northeast is liable to be flooded several inches deep in wet seasons. Rice creek is quite rapid up in the hills and small water-power might be developed by dams. The climate was fine and hot with some rain. No frosts were noticed. The only fuel is wood but it is very plentiful everywhere. No coal, stone quarries or minerals were found. Moose and bear were the only game seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 28.

44. The trail follows along the railway for some distance and then leads off towards the hills somewhat. It is fairly good but has some soft places, and several creeks had to be bridged. The soil is a loam with clay subsoil and would be nearly all good farm land. The surface is level north of the railway and rises towards the south and is slightly rolling. It is all covered with heavy bush. There is considerable green timber in this township, six-inch to fourteen-inch jackpine at the south and east, and six-inch to twenty-five-inch spruce, four-inch to ten-inch birch, ten-inch to fourteen-inch black poplar, six-inch to ten-inch balsam, scattered nearly all over the north third of the township. Hay is very scarce. Water is fresh and plentiful in numerous streams and some muskegs. In some places the land is liable to be flooded on the north side of the railway. There are no water-powers. The weather was warm but often cloudy with several showers of rain and one very heavy rain. No frosts were noticed. The mosquitoes and sandflies were very bad. The only fuel is wood but it is quite plentiful almost anywhere. No coal, stone quarries or minerals were found. The only game seen was moose.—*W. G. McFarlane, D.L.S., 1907.*

Range 29.

44. The trail follows along near the railway, crossing four times and crossing numerous creeks which we had to bridge. It was very soft in many places and crosses some muskeg which had to be corduroyed. The soil is good throughout a good part of the north third of this township, but there is also considerable muskeg. Much of the good land was nearly covered with water, as this was a good season. The surface is level to the north of the railway, but rises some toward the south on the south side. It is all heavily wooded. There is considerable timber scattered through the township but the best of it has been cut off. Poplar six to fifteen inches and spruce from six to twenty-four inches are the chief kinds. A few twelve-inch birch and balsam are also found with six-inch tamarack in muskegs. Hay is more plentiful here than to the east. Several good hay sloughs are found along the north chord. It is all slough hay. The water is all fresh and very plentiful. One or two branches of Armit river run north to the main river. One is about a chain wide and from three

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 29—Continued.

to four feet deep with a current of three or four miles an hour. A considerable part of the land here is swampy and might be flooded at times, as it was this year, several inches deep. There are no water-powers. The weather was warm but often cloudy with some rain. No frosts were noticed. The only fuel is wood, but it is plentiful everywhere. No coal, stone quarries or minerals were found. Moose was the only game seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 30.

24. This township is easily reached by numerous trails and roads running out of Langenburg, a station on the northwestern branch of the Canadian Pacific railway. The roads are all in good condition for a new country. The soil throughout the township is a black loam with clay subsoil and is well adapted for wheat which seems to be the principal grain grown by the settlers. The surface is gently rolling with scattered willow scrub and poplar bluffs in the northerly part. The poplar is small and suitable only for fencing or fuel. There is no timber of any size in the township. There is hay sufficient for the requirements of the settlers, in the sloughs, which are scattered throughout the township. The water in the sloughs is good enough for cattle but not desirable for domestic purposes. There are, however, many good wells in which the water cannot be excelled and generally it is in unlimited quantities. There are no streams of any account. A stream about five links wide crosses the east boundary of section 24 and runs easterly. This stream appears to lose itself in sloughs in many places. There are no water-powers, stone quarries or minerals of any description in the township. The climate is good and generally free from summer frosts. Fuel is scarce and the settlers have to go some ten miles for wood. Game such as wild duck is plentiful. The township is well settled with Canadians from the eastern provinces, Germans and Galicians, all appearing to be in a prosperous condition. It is expected that a branch of the Canadian Pacific railway will be constructed through this township in 1908.—*W. J. Deans, D.L.S., 1907.*

44. The trail runs back to the south of the railway in range 29, about two miles along higher ground until it is about a mile past Westgate when it turns back towards the railway and crosses another branch of Armit river. It then follows along the railway through corduroyed muskeg for about three miles when it comes out into drier bluff poplar country. It was very soft in places and several places were flooded. The ford at the river was good. The soil is chiefly muskeg in the easterly half but the west part is excellent and quite open in places and would make excellent farm land. It is a good loam and clay. The surface is level and almost flat. The easterly half is all covered with small timber and the west side with small timber and scrub, but the intervening part, about 600 acres of prairie, is bluff. There is no timber of any value. It is chiefly small tamarack, spruce and poplar, with considerable alder and willow. Scattered six to twelve-inch spruce and poplar are found. Hay is plentiful on the prairie and is of excellent quality. There are several hay sloughs to the west of the prairie. The water is all fresh and very plentiful in streams and muskeg. Only small streams are found, but they are good ones. The land was partly flooded this summer on account of the wet season, but not deep. There are no water-powers. The climate was fine and warm in general but we had several showers and some cloudy weather, but no frosts. The only fuel is wood but it is plentiful everywhere. No stone quarries, coal or minerals were found. No game was seen.—*W. G. McFarlane, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 31.

44. The route followed in reaching this township runs along near the railway crossing it four times and goes up south of Roscoe. Numerous creeks had to be bridged, and some muskegs corduroyed and soft places brushed as the country is so flat. The water lying on it makes the ground very soft. The soil is excellent with the exception of some muskeg west of Roscoe and a sandy ridge at Roscoe. Along a branch of Armit river, about a mile east of Roscoe, the land is excellent for farming. The surface is almost level. It is almost all covered with small timber. There is no timber of much value although scattered six to fourteen-inch spruce and poplar are found. Tamarack, balsam and birch are also found. Hay is scarce. The water is fresh and very plentiful. Armit river is a good stream about half a chain wide and four to five feet deep with a current of about three miles an hour. This drains a considerable part of the land, but there is some so level that it was almost flooded. There are no water-powers. The weather was usually bright and warm but we had some rain. No frosts were noticed. The only fuel is wood but it is plentiful. No coal, stone quarries or minerals were found and no game was seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 32.

30. This township can be reached by a good trail running from Kamsack, a station on the Canadian Northern railway. The soil in the part of the township lying west of Whitesand river is a black loam with clay and sand subsoil and is well adapted for grain growing. The portion lying between Whitesand and Assiniboine rivers is largely alkaline flats covered with short grass. The surface of the township west of the Whitesand is rolling, while that between the two rivers is level. There is some willow and poplar scrub between the two rivers and some small poplar and willow along the Whitesand near its mouth. There is sufficient hay in the sloughs for the requirements of the settlers. Whitesand river, a stream averaging a chain in width and from two to six feet in depth enters the township on the west boundary of section 31, and running southeasterly joins the Assiniboine on section 4. The water of the Whitesand is fresh and of excellent quality. Assiniboine river forms the easterly boundary of this township. Water-power could easily be developed on Whitesand river by the construction of dams but the amount of energy which could be developed would be small and uncertain. Fuel is scarce throughout the township. The settlers obtain their supplies of wood from Duck mountain. There are no minerals or stone quarries in the township. There is a good market for farm produce at Kamsack, a divisional point on the Canadian Northern railway. The climate is good and generally free from severe summer frosts. Wild duck and prairie chicken are plentiful. Jackfish and goldeye are plentiful in Whitesand and Assiniboine rivers. Small wild fruits grow in great profusion in the sheltered spots along the river banks.—*W. J. Deans, D.L.S., 1907.*

44. This is a fractional township. It is nearly all muskeg and would be very hard to cross with teams. The poplar bush in the west side of range 31 was broken down flat and it would require weeks to cut a road through. The soil is nearly all muskeg and is of little use. The surface is flat and quite a lot of it covered with small spruce and tamarack but there is some open floating muskeg. There is no timber of any value. Hay is very scarce. Water is fresh and very plentiful, especially in the muskeg. Some small streams are found at the south. There are no water-powers. The weather was usually bright and warm but we had some rain. No frosts were noticed. The only fuel is wood, but it is plentiful. No coal, stone quarries, or minerals were found, and no game was seen.—*W. G. McFarlane, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE PRINCIPAL MERIDIAN.

Range 32—Continued.

45. This is a fractional township. The soil is mostly muskeg. There are some stretches of land with poplar, but they are scattered and flat. The surface is flat and thickly wooded except in the muskeg, some of which is open and floating. There is no timber of any value. Hay is not plentiful, but there is some in sloughs towards the north. The water is fresh and very plentiful in muskegs and sloughs. The land was partly flooded several inches deep on account of the wet season and no streams to drain it off. There are no water-powers. The weather was usually bright and warm with some showers of rain, but no frosts. Wood is the only fuel but it is plentiful. No coal, stone quarries or minerals were found and no game was seen.—*W. G. McFarlane, D.L.S., 1907.*

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 1.

37. Access to this township is, at present, by way of a wagon road from sections 6 and 5 southeast to Swan river and connecting there with existing roads. An alternative road crosses Swan river near the southwest corner of the township and connects with a road to Fort Pelly. The surface varies from nearly level land in the west and southwest, to rolling land in the northeast parts, except those parts of sections 19, 18, 7 and 6 on the easterly bank of Swan river and are therefore rough and hilly. The land is generally covered with scrub with scattered bluffs of poplar or spruce. Woods of poplar cover the eastern bank of Swan river in this township and poplar woods were found in sections 25, 26 and 27. In other sections the timbered land is of small area and of no importance except to settlers. Land producing hay is scarce though probably a limited quantity will be found on each section. A number of streams flow through this township, all of which contain excellent water, but in ordinary years these streams would probably become dry. No doubt good water can be obtained by digging wells, as the settlers in the adjoining township to the south have been successful in that way. There are no streams which could be used for water-power. Last season there were no summer frosts and the indications are that in an ordinary year good crops of grain might be grown. The only fuel available is wood of poplar and spruce and it is only in quantities sufficient for the use of settlers. No stone quarries or minerals of value were seen. Moose and deer were occasionally seen, but other game is scarce.—*Edgar Bray, D.L.S., 1907.*

38. Access to this township may be had by wagon trail passing through the easterly sections of township 38, range 2 and from there south and southeasterly to settlements south of Swan river, or by a branch road running along or near the second meridian. Either road is bad in wet weather, but the first is preferable although it is the longer. The land lying west of an imaginary line drawn through the middle of the southeast quarter of section 6 to the northeasterly corner of section 21 is a swamp of spruce and tamarack not suitable for farming. The timber varies in size from mere scrub to large trees up to eighteen inches in diameter though generally the timber is small. East of that imaginary line the surface varies from slightly rolling to rough lands and is suitable for agricultural purposes. It is covered with woods and scrub, in probably equal proportions. The timber is composed of poplar and birch with some spruce and jackpine. Land producing good hay is confined to a few small swamps scattered over the township. A few streams were found in which the water was fresh and good but generally the main supply is found in small ponds of rather inferior quality. There are no water-powers. The climate is practically

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 1—Continued.

the same as that of the country to the south, and no doubt successful farming may be carried on where the land is suitable. The only fuel available at present is wood and it is in considerable quantities and fairly distributed. No stone quarries or minerals of any value were noticed. We found traces of moose and deer but small game appears to have almost disappeared.—*Edgar Bray, D.L.S., 1907.*

45. The soil is usually very good, being a black loam with clay subsoil in general and would make good farm land. The surface is level and mostly covered with heavy timber. The timber is chiefly six to ten-inch poplar but there is also some six to twelve-inch spruce. It is scattered over nearly all this part of the township and is not of great value. Hay is very scarce only a small slough here and there. The water is fresh and very plentiful in streams and over a large part of the surface. The streams are all small with the exception of Smoking Tent creek which is forty feet wide and two feet deep with a current of about four miles an hour. The land is liable to be partly flooded but not to any great depth. There are no water-powers. The weather was usually cool and cloudy with considerable heavy rains. No frosts were noticed. The only fuel is wood but it is plentiful everywhere. No coal, stone quarries or minerals were found. The only game seen was bear.—*W. G. McFarlane, D.L.S., 1907.*

37. The route to and from this township is by a road from Fort Pelly by way of Swan river and also by a road cut by me through township 36, range 2 to section 5, township 37, range 2, and thence northerly. This road connects with existing roads in township 35, range 2. The first mentioned road is rough and hilly while the second is wet and sometimes impassable. The soil where it is dry is mostly a good clay loam and will be found suitable for grain growing or mixed farming. Swan river flows through the easterly part of this township. On each side of this river for a width of three-quarters of a mile the land is rough with frequent bare knolls. In other sections the country is nearly level and, except on the marshes, is covered with either woods of poplar or scrub in about equal proportions with the timber fairly distributed. Very large marshes are a prominent feature in the westerly two rows of sections. These marshes had the appearance of lakes last summer, but in a normal year they would shrink to much smaller size and would generally have much more margin than ten chains between high and low water. Hay in any quantity could not have been cut last year on account of the water, but in a year of ordinary rainfall large supplies of excellent hay may be procured in these marshes. Between these large marshes and the banks of the Swan river we found numerous small marshes producing hay of good quality in a dry season. Swan river and its branches will give an abundant and permanent supply of good fresh water. It is the only stream large enough to be considered as a source of power. In places dams might be built, but as the river is usually very low all winter, and also in dry summer weather, its value for that purpose is not of much account. Last summer was too rainy and cold for successful farming, but as grain growing was a failure in most places in that vicinity last year, this particular tract has not been shown to have an extreme climate. The indications are that growing grain here is as likely to be successful as it is in the partly settled country lying to the south. The first frost in the fall was September 14, which compares very favourably with localities where good crops were harvested. The only available fuel at present is wood. It is fairly plentiful and can probably be procured on every section in the township. No minerals of any value or stone for quarrying were noticed and probably none exist. As tracks of moose and deer were often noticed, it is probably that these animals are here in considerable numbers.

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 1—Continued.

However, small game such as ducks and chickens were scarcely ever seen.—*Edgar Bray, D.L.S., 1907.*

45. The soil is very good in most places, being loam and clay subsoil, but stretches of muskeg run here and there through it. It would make fairly good farm land. The surface is level except where Red Deer river runs through it. Here the banks are quite high and steep. It is mostly covered with timber but there are some large hay sloughs at the east side and a little clearing west of the river beside the railway as well as a few open muskegs. The timber is chiefly six to twelve-inch poplar, but there is some scattered spruce. Small tamarack, balsam and birch are also found. The best timber is near the river. Hay is fairly plentiful in large hay sloughs east of Erwood and close to the railway. It is all slough hay. There is also a little in some of the muskegs farther west but it is too wet to cut much this year. The water is usually fresh and very plentiful in the river, streams, sloughs and muskeg, but there is bad water at Erwood. Red Deer river is about three chains wide and eight feet deep at Erwood with a current of about five or six miles an hour. As this is a very wet season a good deal of the land is practically flooded. There are no water-powers. The weather was rather cool and cloudy with considerable rain but no frosts. The only fuel is wood but it is plentiful. No coal, stone-quarries or minerals were found. The only game seen was bear.—*W. G. McFarlane, D.L.S., 1907.*

Range 3.

37. (*North and east outlines.*)—This township can be reached by a road cut out by me through township 36, range 2, connecting with an existing road leading to Fort Pelly. The soil is mostly a clay loam and is suitable for agricultural purposes. The surface is generally slightly rolling. Sections 36, 32 and 31 are covered with willow and poplar scrub while all the other sections surveyed are timbered with poplar from three to fourteen inches in diameter with occasional clumps of spruce or tamarack. Along and near both the east and north boundaries of this township numerous marshes were found where good hay in considerable quantities might be cut in a year of ordinary rainfall. As all the hay swamps and other depressions were flooded last year water was found almost anywhere. In addition there are a number of streams crossing the lines in which the water is good and the supply probably permanent in most cases. There are no water-powers. The climate is similar to that of partly settled districts a short distance south where good crops of grain have been grown. Poplar wood with a limited supply of spruce is the only available fuel. No stone for quarrying or minerals of any value were found. Small game such as ducks and chickens is scarce. However, numerous traces of moose, deer and bear were noticed.—*Edgar Bray, D.L.S., 1907.*

38. This township can be reached from a road from Fort Pelly to and along Swan river and thence by a road along or near the north boundary of township 37, range 2, to section 1 of this township, or by a road cut out by myself through townships 37, and 36, range 2, to a road now used leading to Fort Pelly. The first mentioned road is rather hilly along Swan river, while the last is level but last season it was sometimes almost impassable. The soil is generally a clay loam and should be suitable for raising grain or for mixed farming. Hay swamps were seen but they are not of much importance. The surface of the part surveyed is mostly slightly rolling and is covered with poplar woods and scrub in about equal proportions. The timber is from three to twelve inches diameter and appears to be fairly distributed. Streams of good fresh water from five to fourteen feet in width will insure an abundant and permanent supply for all pur-

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 3—Continued.

poses. These streams, however, are too small for water-power. During last season the weather was too cold and rainy for successful farming, but in a normal year it would seem that the conditions would be suitable for agriculture. Poplar wood is the only fuel available and it can be found on any of the surveyed quarter sections. No stone fit for quarries was found nor were any minerals of value noticed. Game appears to be scarce though indications of deer, moose and bear were noticed.—*Edgar Bray, D.L.S., 1907.*

45. The country east of Etoimami in this range is mostly muskeg. There are some stretches of poplar where the soil is good but they are scattered. The soil is Etoimami is sandy but west of it there is good loam with clay subsoil, very good for farm land. The surface is flat at the east but is more rolling towards the west especially along Fir river. It is all covered with small timber, six to twelve inch poplar, four to ten-inch spruce and some tamarack to the east, and mostly six to fourteen-inch poplar to the west near the river. Hay is not plentiful except in open muskes or sloughs which were very wet. The water is fresh and very plentiful in streams, sloughs, muskegs and Fir river. The river is a fine stream, about thirty feet wide and three feet deep with a current of about four miles an hour. Much of the eastern part of this township is liable to be flooded several inches deep as it was this year. There are no water-powers. The weather was somewhat cloudy and cold with some rain. No frosts were noticed. The only fuel is wood and it is plentiful. No coal, stone quarries or minerals were found. The only game seen was bear. A few settlers are going into the west and south of Etoimami.—*W. G. McFarlane, D.L.S., 1907.*

Range 4.

38. The route to this township begins at Canora, on the Canadian Northern and runs in a northwesterly direction, passing by Astwood postoffice along a good trail to Fulton's mill in township 38, range 5 and thence easterly along a new trail not very passable in wet weather. In section 1 to 6, the soil is generally good, though the land is rather low. North of these sections, the township is almost entirely muskeg, and only suitable for a cranberry marsh. The surface is timbered and scrubby, covered with poplar, tamarack scattered spruce and willow scrub. This timber will be very useful for homesteaders, but is not in large enough quantities for lumbering. There are about one hundred and thirty-five acres of bush in section 19, consisting of poplar, two to twenty-four inches and spruce two to sixteen inches in diameter. There is approximately thirty-five acres of spruce and tamarack, two to twelve inches, in section 30, about eight acres each in sections 20 and 29 of scattered spruce, two to fifteen inches and poplar, two to ten inches, twenty acres in section 18, and fifteen acres in section 17 of poplar, two to fourteen inches and spruce four to twenty inches. In sections 14 and 15, there is six acres in each of scattered spruce and tamarack, six to ten inches in diameter. There are approximately eighty acres of poplar, spruce and tamarack, six to twelve inches in section 22. In section 27 there is about fifteen acres of poplar, spruce and tamarack, six to twelve inches. In section 23 fifty or sixty acres of poplar, tamarack and spruce, four to twelve inches occur, and in section 24, twelve acres of the same kind. In section 26 there is roughly about forty acres of tamarack, spruce and poplar, six to twelve inches and in section 8, thirty acres of scattered spruce, two to eight inches and poplar two to ten inches, and about twenty acres of the same in section 9, and ten acres in section 17. In section 10 there is about ten acres of scattered spruce two to eight inches and about five acres in section 15. In sections 1 to 6 there is a fair amount of hay spread over these sections, but north of this there is no hay. There is an abundance of fresh water, but in a dry year, the swamps would likely dry up.

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 4—Continued.

As there are no large streams, the land is not liable to be flooded. There are no water-powers. There was frost during every month and ice in August. The rainfall was abundant in 1907. There is plenty of wood for fuel scattered all over the township. There are no stone quarries nor minerals. There were indications that moose were plentiful.—*C.A. Chilver, D.L.S., 1907.*

39 and 40. The only route for reaching these townships is from Wadena on the Canadian Northern railway along a trail running in a northeasterly direction to Kelvington postoffice, thence north to Little Nut lake, thence east over a poor trail, impassable in summer, crossing the north of townships 40, ranges 4, 5 and 6. There is no trail to townships 39, ranges 4, 5 and 6 and a summer trail is not possible and a winter trail very difficult to make on account of the great amount of fallen timber. The soil in these townships is all clay, but at present it is too swampy to be suitable for farming. A very good timber belt of spruce and white poplar lies across the north of this group of townships on the east of range 7. It extends from the north boundary half a mile south. On the east of range 6 it extends from the north boundary two miles south, and on the east of range 4 it extends from the north boundary two and one-half miles south. It is part of the Red Deer Lumber Company's timber limit. The rest of the group is scrubby with small patches of scattered spruce. Hay sloughs are very numerous all through this group. There is an abundant supply of good fresh water. The Piwei flows across the north of range 6 and into the North Etoimami in range 5. It has an average width of fifty feet, a depth of four feet and carries a large volume of water. The North Etoimami flows north through range 5. Before the Piwei joins it has an average width of fifteen feet and a depth of two feet. Its current is slow till the Piwei joins it and then it is swift, having a number of swift rapids, an average width of sixty feet and a depth of four feet. A good deal of the land in these townships is always flooded and impassable in the summer. There are rapids on the North Etoimami, but these have not sufficient fall to be used to develop power. On account of the extensive swamps the climate is cool in the summer, but no summer frosts occurred during the survey. The only fuel available is wood and there is a great supply of dry wood all over this part of the country. There are no stone quarries or minerals of any kind in this group. Moose are very plentiful in this district.—*C. A. Chilver, D.L.S., 1907.*

45. The soil is good in most places, being a black loam with clay subsoil. There is some muskeg but not very much. The surface is level and thickly wooded with the exception of sections 5 and 8, which are scrubby and open. It is mostly timber to the east. Part of section 9 is also open. The chief timber is six to twelve-inch poplar and spruce with some eight-inch tamarack, but the timber is all scattered. Hay is fairly plentiful in sloughs scattered all over. The water is fresh and there is plenty of it in streams, sloughs and muskeg. The streams are all small. The land is not liable to be flooded much, but was a little in some places this summer. There are no water-powers. The weather was usually fine and bright, but we had occasional showers. We had a heavy frost which froze the potato tops. The only kind of fuel is wood, but it is very plentiful. No coal, stone quarries or minerals were found. The only game seen was bear.—*W. G. McFarlane, D.L.S., 1907.*

38. The route to this township begins at Canora on the Canadian Northern railway and follows a good trail running in a northwesterly direction by Astwood post office to Fulton's mill in section 16. The soil is clay with loam in some parts but on account of the extensive muskegs it is not suitable for farming with the exception of sections 1 to 6, which are very good. The south half of section 3 is prairie and a

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 3—Continued.

poses. These streams, however, are too small for water-power. During last season the weather was too cold and rainy for successful farming, but in a normal year it would seem that the conditions would be suitable for agriculture. Poplar wood is the only fuel available and it can be found on any of the surveyed quarter sections. No stone fit for quarries was found nor were any minerals of value noticed. Game appears to be scarce though indications of deer, moose and bear were noticed.—*Edgar Bray, D.L.S., 1907.*

45. The country east of Etoimami in this range is mostly muskeg. There are some stretches of poplar where the soil is good but they are scattered. The soil is Etoimami is sandy but west of it there is good loam with clay subsoil, very good for farm land. The surface is flat at the east but is more rolling towards the west especially along Fir river. It is all covered with small timber, six to twelve inch poplar, four to ten-inch spruce and some tamarack to the east, and mostly six to fourteen-inch poplar to the west near the river. Hay is not plentiful except in open muskes or sloughs which were very wet. The water is fresh and very plentiful in streams, sloughs, muskegs and Fir river. The river is a fine stream, about thirty feet wide and three feet deep with a current of about four miles an hour. Much of the eastern part of this township is liable to be flooded several inches deep as it was this year. There are no water-powers. The weather was somewhat cloudy and cold with some rain. No frosts were noticed. The only fuel is wood and it is plentiful. No coal, stone quarries or minerals were found. The only game seen was bear. A few settlers are going into the west and south of Etoimami.—*W. G. McFarlane, D.L.S., 1907.*

Range 4.

38. The route to this township begins at Canora, on the Canadian Northern and runs in a northwesterly direction, passing by Astwood postoffice along a good trail to Fulton's mill in township 38, range 5 and thence easterly along a new trail not very passable in wet weather. In section 1 to 6, the soil is generally good, though the land is rather low. North of these sections, the township is almost entirely muskeg, and only suitable for a cranberry marsh. The surface is timbered and scrubby, covered with poplar, tamarack scattered spruce and willow scrub. This timber will be very useful for homesteaders, but is not in large enough quantities for lumbering. There are about one hundred and thirty-five acres of bush in section 19, consisting of poplar, two to twenty-four inches and spruce two to sixteen inches in diameter. There is approximately thirty-five acres of spruce and tamarack, two to twelve inches, in section 30, about eight acres each in sections 20 and 29 of scattered spruce, two to fifteen inches and poplar, two to ten inches, twenty acres in section 18, and fifteen acres in section 17 of poplar, two to fourteen inches and spruce four to twenty inches. In sections 14 and 15, there is six acres in each of scattered spruce and tamarack, six to ten inches in diameter. There are approximately eighty acres of poplar, spruce and tamarack, six to twelve inches in section 22. In section 27 there is about fifteen acres of poplar, spruce and tamarack, six to twelve inches. In section 23 fifty or sixty acres of poplar, tamarack and spruce, four to twelve inches occur, and in section 24, twelve acres of the same kind. In section 26 there is roughly about forty acres of tamarack, spruce and poplar, six to twelve inches and in section 8, thirty acres of scattered spruce, two to eight inches and poplar two to ten inches, and about twenty acres of the same in section 9, and ten acres in section 17. In section 10 there is about ten acres of scattered spruce two to eight inches and about five acres in section 15. In sections 1 to 6 there is a fair amount of hay spread over these sections, but north of this there is no hay. There is an abundance of fresh water, but in a dry year, the swamps would likely dry up.

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 4—Continued.

8, but sections 6, 7, 9, 10 and 11 would make fairly good farm land. The soil in these is loam and clay. The surface is all covered with bush, but the greater part of it is scrubby. Some poplar and spruce are found at the west side of the range, but not in any quantity. Hay is plentiful only in the southwest corner of the township. It is all slough hay but of fairly good quality. The water is all fresh and very plentiful. Greenwood river runs through the west side of the range. It is about fifty feet wide, four feet deep and runs about four miles an hour. The southeast part of the township and a little at the southwest corner was flooded this summer on an average of eight inches deep. Small water-power might be developed on Greenwood river, but it would not amount to much. The weather was warm and usually bright. We had occasional showers of rain and a little frost. Wood is the only fuel, but it is plentiful everywhere. No stone quarries, coal or minerals were found. Bears were the only game seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 6.

37. The route to this township begins at Canora on the Canadian Northern railway and runs in a northwesterly direction passing by Astwood postoffice along a good trail to Fulton's mill in township 38, range 5 to township 37, range 5 and then along a new trail west to township 37, range 6. The soil in sections 1 to 12 is very good and is suitable for farming lands but north of this the swamps are so numerous as to render the country of little use for farming and it is suitable only for a timber reserve. About six hundred acres of section 6 and the easterly half of section 1 are covered with poplar varying from two to ten inches in diameter. The remainder of the township is scrubby with a few small patches of fair timber. Hay is very abundant in this township, all of the creeks and streams having hay meadows along their banks growing firstclass blue-joint hay. The water supply is abundant and permanent and all fresh. One stream varying from twenty to fifty feet wide, and two feet deep, flows from the northwest to the southeast of the township. Its current is generally slow. Another stream on an average of eight feet wide and two feet deep flows across sections 7 and 5. It has a fair current. Most of the northern part of the township is flooded during a wet season and is almost impassible for wagons. There are no waterfalls in this township. On account of the swamps the climate is cooler than in the surrounding country and summer frosts were very frequent, ice being formed in August. The only fuel available is wood, white poplar fit for fuel being spread over the township. There are no stone quarries or minerals of any kind in this township. Moose and bear are the only game in this township.—*C. A. Chilver, D.L.S.—1907.*

38. The route to this township begins at Canora on the Canadian Northern railway and follows a good trail running in a north westerly direction to Astwood postoffice thence northerly along a good trail to township 37, range 5, thence westerly along a new trail to township 37, range 6 thence north along new trail to township 38, range 6. The new trail is very poor on account of the water. The soil is mostly clay with black loam but the swamps are so numerous as to render the soil useless for farming. The westerly half of section 18, section 19, section 20, section 29 and section 30, section 31 and westerly half of section 32 are timbered with spruce and poplar varying from six to eighteen inches in diameter. The spruce is not thick enough to be valuable for lumbering purposes but is very valuable for homesteaders. There is also a quantity of timber around Mann lake, spruce and poplar six to eighteen inches in diameter. The easterly half of section 36 is timbered with spruce six to eighteen inches (Fulton's limit.) The remainder of the township is scrubby

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 6—Continued.

There is not much hay in this township as all of the low lands are muskegs, and hay sloughs are very scarce. There is an abundant supply of good fresh water. Though there are no creeks of any size small creeks are numerous. A large portion of the township is flooded the year round. There are no waterfalls. On account of the great extent of swamps the weather is cooler in the summer than in places of similar latitude, and summer frosts occurred during every month of the summer. The only available fuel is wood but this is very abundant all over the township. There are no stone quarries or minerals of any kind in this township. Moose and bear are plentiful.—*C. A. Chilver, D.L.S., 1907.*

39 & 40. The only route for reaching these townships is from Wadena on the Canadian Northern railway along a trail running in a northeasterly direction to Kelvington postoffice, thence north to Little Nut lake, thence east over a poor trail impassable in summer, crossing the north of townships 40, ranges 4, 5 and 6. There is no trail to townships 39, ranges 4, 5 and 6 and a summer trail is not possible and a winter trail very difficult to make on account of the great amount of fallen timber. The soil in these townships is all clay but at present it is too swampy to be suitable for farming. A very good timber belt of spruce and white poplar lies across the north of this group of townships on the east of range 7. It extends from the north boundary half a mile south. On the east of range 6 it extends from the north boundary two miles south, and on the east of range 4 it extends from the north boundary two and one-half miles south. It is part of the Red Deer Lumber company's timber limit. The rest of the group is scrubby with small patches of scattered spruce. Hay sloughs are very numerous all through this group. There is an abundant supply of good fresh water. The Piwei flows across the north of range 6 and into the North Etoimami in range 5. It has an average width of fifty feet, a depth of four feet and carries a large volume of water. The North Etoimami flows north through range 5. Before the Piwei joins it has an average width of fifteen feet and a depth of two feet. Its current is slow till the Piwei joins it and then it is swift, having a number of swift rapids an average width of sixty feet and a depth of four feet. A good deal of the land in these townships is always flooded and impassable in the summer. There are rapids on the North Etoimami but these have not sufficient fall to be used to develop power. On account of the extensive swamps the climate is cool in the summer but no summer frosts occurred during the survey. The only fuel available is wood and there is a great supply of dry wood all over this part of the country. There are no stone quarries or minerals of any kind in this group. Moose are very plentiful in this district.—*C. A. Chilver, D.L.S., 1907.*

45. The soil in this township is in general loam and clay much of it would make good farm land if cleared. Some parts of it however are flooded this season but not very badly. The surface is almost level and all wooded. The east half had some fine timber on it but it is pretty well cut over now. It is mostly spruce. There is still some good eight to twenty-inch spruce and poplar in the west part of the township, and scattered trees on the east part. Hay is rather scarce but there are a few scattered hay sloughs. The water is fresh and very plentiful. Little Greenwood river runs down the east side of the range. It is about thirty feet wide, three feet deep and runs about two and one-half miles an hour. The land is flooded this summer in places but not to any depth. There are no water-powers. The weather was fine and bright with a few showers of rain and a light frost or two. The only kind of fuel is wood but it is plentiful everywhere. No coal, stone quarries or minerals were found. Bear was the only game seen.—*W. G. McFarlane, D.L.S., 1907.*

SESSIONAL PAPER No. 25b

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 7.

39 & 40. The only route for reaching these townships is from Wadena on the Canadian Northern railway along a trail running in a northeasterly direction to Kelvington postoffice, thence north to Little Nut lake, thence east over a poor trail, impassable in summer—crossing the north of townships 40, ranges 4, 5 and 6. There is no trail to townships 39, ranges 4, 5 and 6, and a summer trail is not possible and a winter trail very difficult to make on account of the great amount of fallen timber. The soil in these townships is all clay but at present it is too swampy to be suitable for farming. A very good timber belt of spruce and white poplar lies across the north of this group of townships on the east of range 7. It extends from the north boundary half a mile south. On the east of range 6 it extends from the north boundary two miles south, and on the east of range 4 it extends from the north boundary two and one-half miles south. It is part of the Red Deer Lumber company's timber limit. The rest of the group is scrubby with small patches of scattered spruce. Hay sloughs are very numerous all through this group. There is an abundant supply of good fresh water. The Piwei flows across the north of range 6 and into the north Etoimami, in range 5. It has an average width of fifty feet, a depth of four feet and carries a large volume of water. The North Etoimami flows north through range 5. Before the Piwei joins it it has an average width of fifteen feet and a depth of two feet. Its current is slow till the Piwei joins and then it is swift, having a number of swift rapids, an average width of sixty feet and a depth of four feet. A good deal of the land in these townships is always flooded and impassible in the summer. There are rapids on the North Etoimami but these have not sufficient fall to be used to develop power. On account of the extensive swamps the climate is cool in summer but no summer frosts occurred during the survey. The only fuel available is wood and there is a great supply of dry wood all over this part of the country. There are no stone quarries or minerals of any kind in this group. Moose are very plentiful in this district.—*C. A. Chilver, D.L.S., 1907.*

45. The soil is loam and clay in general but there is also some muskeg scattered here and there. The eastern part of the range is rather flat and quite wet this season, but the west side is drained by Prairie river. The surface is rather flat to the east but gently rolling towards the west. It is all thickly wooded. There is still considerable timber in the west part but a good deal has been cut out near Prairie river. It is spruce and poplar from six to twenty-four inches in diameter. The best of it is already taken up in timber limits. Hay is rather scarce but numerous hay sloughs are found here and there through the range. The water is fresh and plentiful. The only large stream is Prairie river. It is about sixty feet wide, three feet deep and has a current of about four miles per hour. There are no water-powers. The weather was cool and damp and we had about two inches of snow on September 13, and several hard frosts. The only fuel is wood but it is plentiful everywhere. No coal, stone quarries or minerals were found and no game was seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 8.

45. The soil in the eastern half of this township is loam and clay in general and would make good farm land. Quite a large stretch of muskeg runs up through the west half but at the west side there is some more good farm land. The surface is rather flat and all thickly wooded. It is gently rolling to the northeast. There is some fine timber at the northeast corner of the part surveyed. Spruce from eight to thirty-six inches is found. There are also some scattered bluffs of spruce and poplar in the east half and also some at the west side of the township. Hay is scarce, but a

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 8—Continued.

few hay sloughs are found. They were mostly too wet to cut this summer. The water is fresh and very plentiful in the muskegs, sloughs and small streams. There are no large streams. The land is in general rather flat and some of it especially in the muskeg is liable to be flooded a foot deep. There are no water-powers. The weather was bright and warm with occasional frost and some rain. The only fuel is wood but it is plentiful everywhere. No stone quarries, minerals, coal or game were seen. *W. G. McFarlane, D.L.S., 1907.*

Range 9.

45. The route followed was by trail along the Canadian Northern railway east from Mistatim. The trail crosses the railway several times and would be very rough for wagons. The ground was frozen and had five or six inches of snow so that it was good sleighing. The soil is mostly loam and clay but there are stretches of muskeg running here and there through the whole township. Some of it would make good farm land. The surface is gently rolling and all thickly wooded. A considerable quantity of timber is found at the west side and the southeast corner. It is pretty well cut over at the southeast corner now and the best of it has been taken off the west side. A lot of ties have been taken out and piled along the railway. There are still some scattered spruce from eight to thirty inches. Hay is not very plentiful but some long hay meadows are found along a creek in sections 23, 14 and 11. It is chiefly slough grass. The water is all fresh and very plentiful in small streams, muskegs and lakes. The land is only liable to be flooded slightly in the muskegs but not to any depth. There are no water-powers. The climate was fine and frosty. There was about six inches of snow on the ground and the trees were covered with it. We had occasional snow flurries. The only fuel is wood but it is very plentiful everywhere. No coal, stone quarries or minerals were found and the only game seen was lynx. There are some railway tie camps and mills near Bannock but they are not large ones.—*W. G. McFarlane, D.L.S., 1907.*

Range 10

38. The route to this township begins at Wadena on the Canadian Northern railway and runs in a northeasterly direction along a well beaten trail to Kilvington postoffice and thence north and northeasterly on a fair trail to township 37, range 10, thence north along a new trail to this township. The soil, generally is first class but sloughs and swamps are numerous and extensive. The soil is suitable for raising wheat and oats. The surface is covered with scrubby poplar and willow with the exception of sections 6 and 7, which are well timbered with white poplar varying from four to twenty-four inches in diameter. On an average year there would be an abundance of marsh hay, scattered all over the township, also a good growth of upland grass and peavine where the scrub is not too dense. In this township, there is a large and permanent supply of good water. One stream fifteen links wide and two feet deep begins in a lake in section 2 and flows westward across the township. It has a strong current and good water. Very little of the land, except that around the larger lakes, is liable to be flooded and that to no great depth. There is no water-power in this township. Though not there in summer, I heard reports of summer frosts in this township. The rainfall was abundant during summer months. Wood is the only available fuel. White poplar is scattered all over the township. There are no stone quarries or minerals in this township. Game is rather scarce on account of the closeness of the Indian reserve. There are a few jumping deer, mink and fox.—*C. A. Chilver, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 10—Continued.

40. There are no good trails into this township, but by following the old Nut lake trail from Wadena to where it crosses the Indian reserve boundary and from there taking an old Indian trail, leading to Greenwater lake, to the north side of section 21, township 40, range 11 and thence along a trail which we cut, entrance can be gained by fairly dry trail. There is another entrance possible by an old Indian pack trail running north from Little Nut lake, using the Etoimami trail as far as the lake. This trail is very poor in summer time. The soil is a strong heavy one of black loam with clay subsoil and would seem suitable for all kinds of agriculture. The country is rolling and covered with second growth poplar with here and there bunches of larger poplar and spruce, especially to the north end of the township. There is no timber suitable for limits but there is enough for settlers' buildings distributed over the township in small clumps. Nearly all the lakes and marshes have hay along their borders and in the central part of the township there are some good patches of upland hay. There is a plentiful supply of fresh water of good quality in the numerous sloughs and creeks but I would not consider the land liable to be flooded. No water-powers, active or latent, were seen. The survey was made in the fall of the year and the climate seemed like that of Manitoba. For fuel settlers would have to rely on wood which is plentiful all through the township. No minerals of economic importance, stone quarries or game were seen. There were no settlers in the township at the time of survey but doubtless there soon will be. Railways are distant, clearing is fairly heavy and the land hilly and heavy but none of these features is sufficiently emphasized to deter settlers. I would consider this and the adjoining townships as attractive as any I know of for homesteaders, but at present only stock raising could be gone in for at a profit owing to the distance from market. There are numerous small lakes that look as though duck would be plentiful in a good year but this year we saw none.—*Geo. A. Grover, D.L.S., 1907.*

45. The route followed was by trail along the Canadian Northern railway and part of the time on the track. The trail crosses the railway several times and is very rough. The ground was frozen a little on top but would not carry in the swamps or muskegs. However corduroy across the muskeg kept the wagons up. The soil to the north of the railway is in general loam and clay and would make good farm land. There are a few stretches of muskeg running through it. To the south of the railway the west part is almost all muskeg but there is some fair land towards the east. The surface is all heavily timbered. The timber is chiefly spruce eight to thirty inches over almost the whole township with the exception of the southwest corner. A great part of it has been cut out for ties and lumber at Mistatim, but there is a considerable quantity left. The best has all been cut south of the railway. It is flat to the south and gently rolling to the north. Hay is rather scarce but there are quite a number of small hay sloughs here and there. The water is all fresh and plentiful in small streams and lakes. The only part of the township liable to be flooded is the southwest corner in the muskeg and it is flooded now (November) a few inches deep. There are no water-powers. The weather was fine, generally bright and frosty, but with several snow flurries and one heavy snow storm with high winds. We had from two to six inches of snow and zero temperature at times. The only fuel is wood but it is plentiful everywhere. No coal, stone quarries or minerals were found and no game was seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 11.

38. The route to this township begins at Wadena on the Canadian Northern railway and runs in a northeasterly direction along a well beaten trail to Kelvington

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 11—Continued.

postoffice, and thence north along a fair trail to the township continuing through it.

The soil is a good black loam with clay subsoil and is very suitable for farming. Sections 21, 22, 23, 26, 27 and 28, are mixed prairie and scrub. Sections 1 and 12 are timbered with poplar varying from four to sixteen inches in diameter, and the remainder of the township is scrubby. The only timber is on sections 1 and 12, being white poplar four to sixteen inches, and is suitable only for building logs.

There are one thousand acres or more of firstclass hay land lying around Little Nut lake and a number of smaller meadows scattered about the township. There is a large permanent supply of good fresh water. The only large stream of water enters the township in section 18 and flows northwest to Little Nut lake. It is on an average twenty links wide and two feet deep. It has a strong current and carries a large volume of good water. There are no water-powers in this township. The climate is generally good but summer frosts were reported during last season. The rainfall was abundant. The only available fuel is wood, white poplar being spread over the township. The hay lands around Little Nut lake are generally flooded in the spring, but just enough to give a good hay crop. There are no stone quarries or minerals in this township. Jumping deer, fox, wolves, beaver, mink, ducks and partridge are found but are not plentiful.—*C. A. Chilver, D.L.S., 1907.*

39. The only trail into this township is an old Indian pack trail, which can be used for wagons by cutting in some places. The Nut Lake trail to the Hudson's Bay company's post and from there trails running north and south of Little Nut lake, (the former almost impassable in summer), lead into this township. The pack trail mentioned runs from the north side of Little Nut lake diagonally across the township and can be reached by following either of the trails mentioned to the lake and thence along the bank of the lake. The soil is a rich loam on clay subsoil and should be suitable for all kinds of agriculture. The surface of the township is rolling and covered with second growth poplar and scrub with here and there a spruce swamp. There is no timber of value, though there would be enough for the settlers first buildings. Hay, both upland and marsh, is plentiful all through the township. There is a plentiful supply of water, in fact the great number of lakes and marshes is one of the chief drawbacks to the country. There is no natural water-power but a small dam would serve to develop one of some value along the creek, which flows in a deep valley joining Round lake with Little Nut lake. This creek is locally known as Little Red Deer river, forming as it does part of Red Deer river system. The survey was made in December but the climate seemed very mild and equable. The only fuel available is wood, which can be procured any place in this township. No stone quarries, economic minerals or game were noticed.—*Geo. A. Grover, D.L.S., 1907.*

40. We reached the township by a fair trail from Wadena, Sask., to the Nut Lake Indian reserve, where we used an Indian trail running to Greenwater lake, crossing the west side of the township, and from there cut a trail running nearly due east along the north side of sections 21, 22, 23 and 24; this is the only trail in the township. The soil is a rich loam on clay and well suited for all kinds of agriculture. The country is covered by small poplar, with here and there larger poplar and bunches of spruce, particularly towards the north end. This end of the township is much broken by the Greenwater hills, but the south half is only gently rolling. The only timber of any size is in the above mentioned clumps of spruce scattered through the township, but more particularly towards the northeast corner. Good hay is plentiful throughout the township, both the marsh and upland varieties.

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 11—Continued.

There is an abundance of water in the sloughs and creeks of the township and it is fairly good though rather alkaline. No water-powers, economic minerals, stone quarries or game were seen. The climate seemed very similar to Manitoba, but of course the survey was made in the fall of the year and frosts were frequent. Fuel is plentiful, wood being well distributed over the township. On the whole, I would consider this a first class township for settlers; at present it is chiefly suited for cattle, there being abundance of feed, water and shelter, but it should grow excellent crops when a railway gets near enough to provide a market for grain. The nearest railway at present is the Canadian Northern at Wadena, some fifty miles away. There are no settlers in the township at present, but the tide of immigration is gradually pressing this way. Some twelve miles south in similar country good crops are grown.—*Geo. A. Grover, D.L.S., 1907.*

45. The soil to the north of the Canadian Northern railway is generally clay and loam and would make good farm land, except near the west side, where it is nearly all muskeg. To the south of the railway it is nearly all muskeg except around section 8, which is more clay and loam. The surface is all thickly wooded. South of the railway it is mostly flat muskeg with small spruce and tamarack, but there is some scattered spruce and poplar from six to twenty inches in diameter. To the north it is rolling and there is also some scattered timber here and there over the whole township but not to any extent. Hay is very scarce. The water is all fresh and fairly plentiful. There is plenty of it in the muskegs, but not so much to the north except in lakes. There are no water powers. The weather was quite changeable, rather frosty at times and then mild again. We had about two inches of snow in November. The only fuel is wood, but it is plentiful everywhere. No coal, stone quarries or minerals were found and no game was seen.—*W. G. McFarlane, D.L.S., 1907.*

Range 12.

41 and 42. (*East boundary*)—The east boundary of township 41, range 12, starts in a hilly country at the base line. It is all very thickly wooded with small poplar and willow scrub, and descends somewhat rapidly towards the north. The soil here is good, but a large lake runs along the east side of the line for a mile and a half. Farther down the slope the soil is still good and the timber becomes larger. Spruce from six to thirty inches and poplar from six to ten inches are found in scattered clumps. All along there grows a dense underbrush of hazel and alder scrub, and this with windfall would make it very hard to cut a road through. A short distance to the west is Red Deer river running through a deep ravine. Numerous hay sloughs are also found. As we got nearer the north side of the township the line came out into smaller scrubby poplar with small openings of prairie. Here the soil is very good but a little farther north it crosses another muskeg or two and then runs into thick poplar, scattered six-inch spruce and tamarack and a few twelve-inch jackpine. The line crosses Red Deer river on the east boundary of section 25 and runs on through rolling scrubby country to the north boundary of the township. The country to the west is more open and would make fair ranching or farm land, while to the east there are some timber limits. The country is well watered with fresh water and the climate in the fall is bright and clear, but early frosts have been experienced. There are no houses except Indian shacks, and these are vacant.—*W. G. McFarlane, D.L.S., 1907.*

42. The route followed was by trail along the prairie in the valley of Crooked river down to the east boundary thence south and west along a good trail through small

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 12—Continued.

poplar and willow until we came to some more prairie in section 35. The trail then follows south along a stretch of prairie down to the south chord, where it strikes Red Deer river. It is all good with the exception of three short soft holes. The soil here is more sandy than in township 43. It is generally a black sandy loam except near the south boundary west of Red Deer river, where it is very sandy. The northern part of the township would make very fair farm land, in fact some of it is exceptionally good to the north. The subsoil, however, is usually a little sandy. The surface is gently rolling. A stretch of prairie about thirty chains wide runs north and south along near the centre of the township and the rest is mostly covered with willow and poplar scrub. To the south there are several jackpine ridges and to the east some spruce and poplar two to ten inches in diameter. There is no timber of any value but a little poplar and spruce, six to ten inches in diameter is found near the east boundary, and a little jackpine of the same dimensions near the south boundary. Hay is fairly plentiful on the prairie and is of good quality. There is also some slough hay along near Red Deer river. The water is fresh and very plentiful in Red Deer and Barrier rivers, streams, muskegs and lakes. Red Deer river is a fine one. It is from fifty to one hundred feet wide, from three to eight feet deep, and has a current of about three miles an hour. It is very winding. It comes in at the south side of the township near the southeast corner and flows northwest until joined by the Barrier, and then northerly until it crosses the north chord, when it turns easterly and crosses the east boundary of section 25. The Barrier is fully larger than the Red Deer but is sluggish. It comes in near the centre of the south boundary and joins the Red Deer about one and a half miles up. They are both full of pike. The northwest corner of the township is muskeg and is flooded about a foot deep now (October). There are no water-powers. The weather was very fine and bright with frosty nights and clear bright days without rain or snow. Wood is the only fuel, but it is fairly plentiful everywhere. No coal, stone quarries or minerals were found, and jumping deer was the only game seen.—*W. G. Farlane, D.L.S., 1907.*

43. The route followed to this township was by the Canadian Northern railway to Crooked river, then by wagons on a trail running south. The trail follows along the foot of a hill for about ten miles and is very wet and muddy from springs and streams along the hillside for the first five miles. After we got five miles out we found the trail much better and only occasional soft holes. The soil in this township is generally very good with the exception of the southwest corner which is nearly all muskeg. It is a good sandy black loam usually with a clay subsoil, which would make very good farm lands. The surface is slightly rolling but is broken by the valley of Crooked river which takes its rise in this township and runs up through the centre of it. The valley is over one hundred feet deep at the north boundary. There is a strip of prairie in the valley and also some in sections 29 and 32. The greater part of the rest is covered with scrub but there are a few small clumps of timber. There is very little timber in this township. Only a few small clumps of poplar and spruce from six to twelve inches in diameter to the south and a little from six to fifteen inches near the north boundary. Hay is fairly plentiful on the prairie, and is of excellent quality. The water is fresh and very plentiful in streams, muskegs and swamps. The streams are all very small. The only part of the land liable to be flooded is the northwest and southwest corner, which are flooded now (November) from six inches to two feet deep. There are no water-powers. The weather was fine and bright. We had one snowfall of about an inch. It was frosty at nights and bright and warm in the day. The only fuel is wood, but it is quite plentiful almost everywhere. No coal, stone quarries or minerals were found. Moose and bear were

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 12—Continued.

the only game seen. Settlers are coming into the township and a great part of it should soon be taken up. There is a cattle ranch just east of the boundary line.—*W. G. McFarlane, D.L.S., 1907.*

Range 15.

30. The south half of this township is rolling, broken in some places with dense growth of willow scrub and underbush interspersed with numerous hay sloughs, which are covered with good patches of prairie hay making very good pasture. The north half is more timbered with poplar suitable for building, most of it being ten to twelve inches in diameter. Black willow and clumps of dry poplar occur, the latter being good for fuel. The centre of this township is too low and swampy for cultivation at present. The soil is first class, being composed of black loam with clay loam subsoil. There are no creeks worth mentioning, although the township is very well watered by different lakelets and sloughs.—*A. Bourgeault, D.L.S., 1906.*

31. This township is generally undulating but becomes rolling towards the south boundary, the timber also becomes denser. The hollows or low places in the south part are generally covered with marshes or swamps, having a luxuriant growth of hay, surrounded by extensive belts of tall dry willow. This part is more or less timbered with medium sized poplar and some scattered white birch, both being suitable for building purposes. Large quantities of small willow also occur. The north half of the township is covered with scattered bluffs of poplar interspersed with patches of prairie. The soil ranks as first class all over the township, being composed of rich black loam and clay loam subsoil. There are some reddish coloured boulders and some fragments of limestone in large quantities on sections 33, 34, 35 and 36. This township is crossed by the branch of the Canadian Pacific railway, now under construction, running west from Yorkton. It crosses sections 36, 35 and will be of great advantage to this vicinity.—*A. Bourgeault, D.L.S., 1906.*

50. Lost River postoffice is situated on the northwest corner of section 6 of this township. It can also be reached by a trail crossing Saskatchewan river at Fort à la Corne and running north to township 50, range 16, thence easterly to this township, entering it on section 30, a distance of about fifty miles. This trail is in fair condition. The soil is sandy loam and should be suitable for mixed farming. The surface is wooded, covered with poplar and balm of Gilead, from two to ten inches in diameter, some spruce and tamarack, interspersed with large patches of poplar and willow scrub. Spruce up to fourteen inches can be found scattered over the township, but of no practical value for lumbering with the exception of a small grove of spruce running from twelve to thirty-six inches on the east boundary of section 10. A small portable mill might be used a season here to advantage. There are small hay sloughs all over the township from which a quantity of second quality hay could be obtained. There are a number of small creeks of good water running into Saskatchewan river. Red Deer creek touches the northeast corner of the township. It is a stream of good water about six or eight feet wide and three feet deep. There is no liability of flooding. Water-power could be developed from the Cadotte and Nipawin rapids on Saskatchewan river, but only at a great cost, as the banks are very high and but a few feet of head. The climate this fall was very mild, and open with very little snow. Large portions of Saskatchewan river remained unfrozen at the time of leaving this district (December). Deadwood in abundance can be obtained for fuel. No stone, coal or mineral were found. Moose, jumping deer and partridge were seen.—*R. H. Montgomery, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 15—Continued.

51. The soil in this township consists of clay, sandy and black loam, with clay subsoil. On sections 1, 25 and 36, the land is suitable for mixed farming. The township is wooded, covered with small poplar, tamarack and spruce, not exceeding eight inches. No hay sloughs were seen. A large muskeg runs south from section 24, to the middle of section 12 extending in places about one and one-half miles east and west. Two small creeks traverse the township, and with the muskeg afford an ample supply of good water and no scarcity is feared.—*R. H. Montgomery, D.L.S., 1907.*

52. The soil in this township consists of sand and black loam. The southern portion contains black loam averaging six inches with clay subsoil suitable for mixed farming. The township is entirely wooded, covered with poplar, balm of Gilead, jack-pine, spruce and tamarack. The timber seen is a poor sample. A few second grade hay sloughs were seen. Torch river is a stream one hundred and thirty feet wide, six feet deep with a current of three miles an hour, which crosses the township in section 36. Whitefox river is a stream sixty feet wide four feet deep, with a current of three miles an hour and crosses the township in section 25. Both the rivers contain excellent water and no scarcity is feared.—*R. H. Montgomery, D.L.S., 1907.*

Range 16.

30. This township is generally rolling and undulating country except the west part of sections 18 and 19 which are hilly; more or less covered with dense poplar bluffs scattered all over the township; outside the bluffs it is small poplar and willow. There are a few sections which would have been worth mentioning as a timber reserve, but owing to the numerous settlers who hauled timber last winter for building, I do not think any reservation advisable. I have seen during the progress of survey a good many teams making one trip every day and lots of piles of timber all over the township. There are principally in the west parts many lakes which seem to increase yearly. The soil is first class being a good depth of black loam with a clay subsoil. There are also numerous sloughs and swamps surrounded by black willow. This township lies at the east end of Touchwood hills. It will not be fit for farming before a good fire has cleaned it.—*A. Bourgeault, D.L.S., 1907.*

31. This township is for the most part rolling and undulating country, interspersed with small poplar suitable for fencing, willow and underbrush. It has the advantage of being close to the branch of the Canadian Pacific railway running west from Yorkton, as this line, now under construction, runs close to the north boundary of sections 36 and 35. The south half of this township is very well timbered, especially the south half of sections 15 and 16, and east half of section 17 which is densely timbered with large poplar suitable for building. There are also numerous clumps of willow. A great many people came over thirty miles to cut logs here. The soil is good black loam with clay subsoil and ranks as first class all over the township. However, owing to the dense bush and windfall on the south half, it is not fit for immediate cultivation. I presume that before long, fire will burn up the brush and windfall. Hay is abundant in the sloughs and marshes. The water is, generally, good, but there is only one creek worth mentioning which runs in a northerly direction. There are many large boulders of reddish coloured granite, and a large quantity of limestone.—*A. Bourgeault, D.L.S., 1906.*

50. At the southeast corner of this township is Lost River postoffice. It can also be reached by trail, about forty-two miles from Fort à la Corne. This trail runs due north from the river to township 50, range 20 thence easterly entering this township in section 19. The condition is fair, but rather hilly near the river. The soil is

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 16—Continued.

principally sand with belts of black loam and clay, only a small portion being suitable for mixed farming. The surface is entirely wooded, consisting of jackpine, poplar, spruce and tamarack bush, with poplar, jackpine, birch and willow scrub. Jackpine up to sixteen inches and poplar to fourteen inches can be found all over the township but not in sufficient quantities for lumbering purposes. No large hay sloughs were found. There are plenty of muskegs in this township and a few small creeks, affording an ample supply of good water. There is no danger of floods. No water-power is available. The climate last fall was warm and clear with little rain. The first frost was noticed on August 20th. Deadwood in abundance can be obtained for fuel. No coal, stone or minerals were found. Moose, jumping deer and part-ridges were seen.—*R. H. Montgomery, D.L.S., 1907.*

51. The soil in this township consists principally of clay, with a little sandy loam, and clay subsoil. It is suitable for mixed farming. The surface is entirely wooded, covered with small poplar, and balm of Gilead, not exceeding ten inches. No hay sloughs were seen. Whitefox river is a stream ninety-three feet wide, four deep, with a current of three miles an hour, which enters in section 19, and leaves in section 25. This river with several small creeks, afford an ample supply of good water and no scarcity is feared.—*R. H. Montgomery, D.L.S., 1907.*

52. The soil in this township is clay and black loam; a few belts of black loam averaging twelve inches with clay subsoil is to be found. The land is, generally speaking, low and only on sections 12 and 1 can be found land suitable for mixed farming. The township is entirely wooded, covered with spruce, poplar, balm of Gilead, balsam and birch. Some very good spruce up to thirty inches, and poplar up to twenty inches can be found through the township. No hay sloughs were seen. Fern creek, twenty-five feet wide, three feet deep with a current of one and one-half miles an hour, crosses the township in section 36. This creek with other small ones, afford ample supply of good water and no scarcity is to be feared.—*R. H. Montgomery, D.L.S., 1907.*

Range 17.

1. This township was reached from Weyburn by following the settlers' and ranchers' trail to Sandoff's ranch in township 3, range 16, then westward to the northeast corner of township 2, range 17, and from there southward along the east outline of township 2, range 17. The soil in this township is good and well suited for agricultural purposes, although the northeast part of the township is rather hilly. The surface is everywhere prairie with no timber. Redtop and marsh grass of good quality abound in the hay marshes. Good fresh water was easily obtainable in the marshes and sloughs at the time of survey (June) and snow-water was still to be had. No streams nor water-powers occur and the land is not liable to flooding. The climate at the time of survey was cool with light frosts. No fuel, stone quarries nor minerals were found. Duck was the only game seen.—*J. L. R. Parsons, D.L.S., 1907.*

2. This township was reached from township 1, range 17, by travelling northward along the central meridian. The soil is light but of fair quality; the south two-thirds of the township being well suited for agricultural purposes while the remainder is very rough and broken. The surface is everywhere prairie with no timber. Marsh grass and redtop of good quality are to be had in the small hay marshes which abound throughout the township. Good fresh water was readily found at the time of survey (June) in the numerous sloughs and marshes. No streams nor water-powers occur, nor is the land liable to be flooded. The climate was cool and wet at the time of sur-

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 17—Continued.

vey. No fuel, stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

30. (Part.) This survey included fractional sections 25, 36, 28 and 33 and sections 26, 27, 34 and 35, township 30, range 17. This part is rolling, hilly and broken, no wood worth mentioning, being more or less covered with small poplar and poplar and willow scrub and some scattered dry stumps of poplar. The soil is somewhat gravelly especially on the hillocks and it seems that all the alluvial soil had been burnt. It might rank first class. On account of lower spots where the soil is good black loam, it offers good pasture with abundant grass and peavine. The water is also plentiful and well distributed.—*A. Bourgeault, D.L.S., 1906.*

51. The soil in this township consists of clay, black and sandy loam. The northern portion has black loam averaging six inches with clay subsoil, and clay suitable for mixed farming. The township is wooded, covered with small poplar, balm of Gilead, jackpine, spruce and tamarack, not any exceeding ten inches. No hay sloughs were seen. Between sections 7 and 12 is a lake extending fifty-one chains south, about thirty chains east and about one and one-half miles west. Whitefox river is a stream fifty-five feet wide, three feet deep with a current of three miles an hour. It enters in section 19, and crosses in section 24. This river, with other small creeks and the lake, afford an ample supply of good water, and no scarcity is feared.—*R. H. Montgomery, D.L.S., 1907.*

52. The soil in this township is principally clay, the land is low, and soil too sticky for farming. The township is entirely wooded, covered with poplar, balm of Gilead, spruce and birch. Some good poplar up to thirty inches and spruce up to sixteen inches, can be found in the northern sections. A few small second grade hay sloughs were seen. Small muskegs and creeks traverse the township and no scarcity of good water is to be feared.—*R. H. Montgomery, D.L.S., 1907.*

Range 18.

1. This township was reached from township 1, range 17, by following the north boundary westward. It is very hilly. The soil is good, but owing to the north half of the township being very hilly, only the south half is suited for agricultural purposes. The surface is everywhere prairie, rolling in the south half, and very hilly in the north half. No timber is found. Good marsh hay is abundant in the numerous small hay marshes. Fresh water was readily obtainable in the numerous small sloughs and marshes at the time of survey (June). There are no streams and consequently no water-powers. The climate was warm and fine at the time of the survey with no frosts. There are no minerals, stone quarries nor fuel. The only game noticed was duck.—*J. L. R. Parsons, D.L.S., 1907.*

2. This township was reached from township 1, range 18, by a trail northward along the central meridian. This trail was very hilly in its southern part. The soil is light but of good quality. On account of the hilly nature of the two north tiers of sections and also of the two south tiers, only the centre is suited for agricultural purposes, the remainder being excellent grazing land. The surface is everywhere prairie with no timber. Abundance of good marsh grass and bluejoint are obtainable in the numerous small hay marshes throughout the township. Fresh water was plentiful at the time of survey (June) throughout the township, in the small sloughs and marshes. No streams nor water-powers occur and the land is not liable to be

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 18—Continued.

flooded. The climate is moderate, with no frosts at the time of survey. No fuel, stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

51. The soil in this township is principally black loam and clay. The land is, generally speaking, 'low,' and of very little use for farming. The timber in this township consists of poplar, balm of Gilead, spruce, and tamarack, from two to fourteen inches, a poor sample and useless. A large second grade hay slough is found on section 13, running south to the centre of section 12. There it develops into a muskeg which continues south to the centre of section 1, extending east and west as far as can be seen. Whitefox river is a stream seventy feet wide four feet deep with a current of four miles an hour, which enters in section 19, and leaves in section 24. This river, with a creek and several muskegs afford an ample supply of good water and scarcity is not feared.—*R. H. Montgomery, D.L.S., 1907.*

52. The soil in this township consists of gravel, clay and black loam. The southern portion has black loam averaging five inches with clay subsoil suitable for mixed farming. The township is entirely wooded, covered with poplar, balm of Gilead, spruce and tamarack. Spruce up to thirty-six inches and poplar up to twenty-four inches can be found scattered throughout the township. No hay sloughs were seen. Small muskegs and creeks are to be found. No scarcity of good water is to be feared.—*R. H. Montgomery, D.L.S., 1907.*

Range 19.

49. The township is reached by a trail running northwesterly from Fort à la Corne, centering on the west boundary of section 31. This trail is in a fair condition but rather hilly, near Saskatchewan river. The soil is chiefly sand with an occasional belt of black loam. The surface is covered with jackpine from two to ten inches in diameter with a few patches of poplar and jackpine scrub. Jackpine, spruce, poplar and tamarack are found in this township, but of no practical value for timber, owing to small size. There are no hay sloughs. English creek enters from the north crossing section 34, it is about ten feet wide, two feet deep and flows three miles an hour. There are also several other small creeks draining this township. The water is excellent but there is no water-power. The climate this summer was cool and damp, the first frost being noticed on August 20. Deadwood in abundance can be obtained for fuel. No coal, mineral or stone is to be found. No game was seen except partridges.—*R. H. Montgomery, D.L.S., 1907.*

51. This township lies about seventeen miles by trail north from Fort à la Corne. This trail runs due north from Saskatchewan river, entering this township on section 6. It is in fair condition but is inclined to be hilly near the river. The soil north of Whitefox river is black loam six inches deep with a clay subsoil, and is suitable for mixed farming. South of this river it is generally sand. The surface is entirely wooded. A few large patches of scrub can be found. Poplar, balm of Gilead, jackpine, spruce, tamarack and birch are here, while the scrub consists of poplar, jackpine and willow. On sections 22, 23, 26, 27, 34 and 35 some very good spruce is to be found, averaging from four to thirty inches, very suitable for lumbering purposes. Poplar up to fourteen inches and jackpine up to twelve inches can be found but of no practical use for lumbering. There are a few small hay sloughs scattered over the township producing a second grade of hay. Whitefox river cuts across the township entering on section 18, and leaving from section 24. It is a stream of good water fifty feet wide, six feet deep and has a current of about three miles an hour. There is a large

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Range 19—Continued.

muskeg south of this river and could, if occasion demands it, be easily drained by this river. There is no water power. The climate this summer was cool and damp, and flies were numerous. The first summer frost was noticed on August 20th. Deadwood in abundance can be obtained for fuel. Coal, stone or mineral were not found. Moose, and partridge were to be seen.—*R. H. Montgomery, D.L.S., 1907.*

52. The soil in this township consists of black loam, and sand, the majority is black loam averaging five inches with a subsoil of clay suitable for mixed farming. The township is entirely wooded covered with spruce, tamarack, poplar, jackpine and balm of Gilead. Spruce and poplar up to sixteen inches can be found in the northern portion. A few hay meadows with firstclass hay were seen. There is a large muskeg in the northern portion of this township and a creek, so no scarcity of good water is to be feared.—*R. H. Montgomery, D.L.S., 1907.*

Range 20.

50. This township lies ten miles from Fort à la Corne by trail. It can be reached by a wagon trail straight north of Saskatchewan river. This trail is in fair condition, but rather hilly. The soil is principally sand, with a few patches of black loam and clay. The surface is wooded, covered principally with jackpine. There is also spruce, tamarack and poplar, with poplar, jackpine and willow scrub. The jackpine averaging from 2 to 10 inches in diameter is the only timber to be found. There is one lake on section 18 in this township, while large muskegs are found scattered all over it, but no creeks are to be found. There is no danger of drought or flood. No water-power is available. No hay sloughs are to be found. The climate this year has been damp and cool, the first frost being noticed on August 20th. Deadwood in abundance can be obtained for fuel, but no coal, stone or mineral are to be found. Moose and jumping deer are plentiful.—*R. H. Montgomery, D.L.S., 1907.*

51. This township lies about seventeen miles by trail from Fort à la Corne. This wagon trail runs northerly from Saskatchewan river, and is in good condition, but is inclined to be hilly near the river. It enters on section 5, north of Whitefox river, the soil is black loam, averaging sixteen inches, with clay subsoil, and the land should be suitable for mixed farming. South of Whitefox river the soil is principally sand. The surface is wooded with large patches of scrub, poplar and Balm of Gilead, with poplar and willow scrub north of the river, and jackpine, spruce and tamarack south of it. The timber consists of jackpine, poplar, balm of Gilead, spruce and tamarack, but it is too small for any lumbering purposes. Whitefox river has a width of forty feet, a depth varying from two to ten feet and a current of two and one-half miles per hour. The water is excellent. It enters the township in section 18, and leaves from section 13. Large muskegs lie to the south of Whitefox river. There is no water-power available. There are no hay sloughs. The climate this summer has been cool and damp, the first frost being noticed on August 20th. Deadwood in abundance can be found for fuel. No stone, coal or mineral can be found. Moose and jumping deer were seen.—*R. H. Montgomery, D.L.S., 1907.*

52. The soil in this township consists of sand, clay, black and sandy loam. The southern portion has a belt of sandy and black loam, averaging six inches, with clay subsoil suitable for mixed farming. The township is wooded, covered with spruce, tamarack, jackpine and poplar, suitable for lumbering purposes. No hay sloughs are to be found through the township. Moose and jumping deer are to be seen.—*R. H. Montgomery, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 21.

50. This township lies about fourteen miles by trail from Fort à la Corne. It can be reached by a wagon trail running north from Fort à la Corne to the south boundary of township 50, range 20, thence running northwesterly entering this township in section 13. This trail is in fair condition but is hilly near Saskatchewan river. The soil is mostly sand with occasional belts of black loam and clay. The surface is wooded, covered principally with jackpine. There is also spruce, tamarack and poplar with willow scrub. The timber on this township consists of jackpine averaging from eight to twelve inches and could be used for ties. There are no large hay sloughs to be found. Plenty of small hay sloughs covered with scattered willow are present. There are no large creeks but large muskegs are found all over the township in which the water is fresh. There is no danger of flooding. There are two lakes in the township, lake No. 1 in section 7 and 18 and lake No. 2 in section 13. There is no available water-power. The climate this year has been damp and cool, the first frost being noticed on August 20. Deadwood in abundance can be found for fuel, but no coal, stone or minerals are to be found. Moose, jumping deer, duck and sand-hill crane are plentiful.—*R. H. Montgomery, D.L.S., 1907.*

52. The soil in this township is principally sand and black loam. A belt of black loam averaging twelve inches, with a clay subsoil runs across the southern portion. This township is suitable for mixed farming. It is entirely wooded, covered by spruce, jackpine, tamarack and poplar, and some good spruce up to thirty-six inches in the northwest corner of this township around Birchbark lake. Poplar up to twenty-four inches can be found in the western portion. No hay sloughs were seen. Birchbark lake lies in the northwest corner, several small creeks traverse the township, also large tamarack and spruce muskegs are to be found. No scarcity of water is to be feared.—*R. H. Montgomery, D.L.S., 1907.*

Range 22.

44. We entered this township by a good trail from Kinistino. The northern part of this township is fairly level, the southern part rolling and hilly, while the whole is covered with thick poplar and willow, except a few places which have scattered bluffs of poplar and willow. About one-half the township is covered with sloughs, swamps and deep muskegs; so much so that we were unable to complete the northeast portion which will have to be done in the winter or when the lakes are frozen over. For this reason we had great difficulty in doing as much of the survey as we did. The soil throughout is first class, the alluvial soil being black loam varying in depth from five to twelve inches, with a clay subsoil. Hay is obtained in abundance from the many marshes. The water in the many sloughs, lakes, &c., is sweet and good, while the supply is unlimited. In the spring the water around these lakes and marshes is considerably higher than during the summer. There are no water-powers, indications of coal, minerals or stone quarries. There are only three or four settlers in this township. A surveyed trail runs into this township from the north for a few miles. A deep creek running across this township is crossed by a fairly good bridge on the surveyed trail. By far the greatest portion of this township is unfit for cultivation. We did not have, nor did we hear of, summer frosts. Very little game was seen, except ducks, geese and pelicans, which were quite numerous.—*E. W. Hubbell, D.L.S., 1907.*

51. This township is situated about thirty-five miles by road northeast of Prince Albert. A trail leading into it leaves the Candle lake trail about thirty miles from Prince Albert. Both trails are in poor condition. The soil consists of a heavy black

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 22—Continued.

loam sixteen inches in depth with a clay subsoil, and the land generally speaking would be excellent for mixed farming. The surface is well wooded, but hay sloughs and meadows are numerous. Poplar averaging from two to six inches in diameter is generally found with poplar and willow scrub. There is little timber. Spruce averaging from four to thirty inches is found on sections 11, 12, 31 and 32, and poplar on the eastern portions of sections 7 and 31. There are numerous hay sloughs of second class quality all over the township. They are generally found adjoining Whitefox river. This river enters the township on the west boundary of section 30 and leaves on the east boundary of section 1. Where it enters the township it is about thirty feet wide and two feet deep with a current of two miles per hour. But from the northeast corner of section 10 to where it leaves the township it is one hundred feet wide, two feet deep and has a very sluggish current. A large tamarack muskeg at the south covers about one-third of the township. This could be easily drained into the river and a tract of very rich land could be secured. There is no water-power. The climate is very mild in summer, the first frost being noticed on the twenty-second of August, while open water was not frozen over till the fifteenth of November. There is no scarcity of deadwood for fuel, but no coal or minerals are to be found. There are stones and boulders along the river. Moose, deer and duck were the only game seen.—*R. H. Montgomery, D.L.S., 1906.*

52. This township lies about forty miles by trail from Prince Albert. It can be reached by following the Candle lake trail to township 52, range 23, thence easterly to the township by a pack trail. The northeast portion of the township is sandy and the remainder is black loam sixteen inches deep with a clay subsoil. The surface is entirely wooded, being covered with spruce, jackpine, poplar, birch and large patches of poplar and willow scrub. Birchbark lake cuts off the northeast corner of the township. It is a large pear-shaped body of water, with the apex to the south. It is about four miles long and four miles wide and extends south along the east boundary of this township for two miles. The main portion of the lake, however, is in township 53. Loon lake lies in sections 6 and 7. It is about one and a half miles long by one-half mile wide. The surface of this township is somewhat hilly. Large muskegs are found adjoining Birchbark lake on the southwest shore. Hay sloughs are found scattered throughout the township and should render the land suitable for mixed farming.—*R. H. Montgomery, D.L.S., 1906.*

Range 23.

4. This township was reached from township 4, range 18, by following the second base line westward. The soil is good, supporting a luxuriant growth of upland grass. The southern part of the township is too hilly and broken to be of use for agricultural purposes, but the northern part is good agricultural land. The surface is prairie with no timber, except a small amount of poplar scrub in the ravines in the southern part. A considerable amount of hay is found in the numerous small hay marshes throughout the township. Fresh water is everywhere to be found in the marshes and sloughs, but no water-powers occur and the land is not liable to be flooded. The climate is moderate with no summer frosts. A small amount of deadwood is found in the ravines in the southern part of the township. Coal occurs on the south shore of Coalmine lake. It is a low grade lignite, but burns readily in an ordinary cookstove. A considerable amount has already been taken out by the settlers from the adjacent country. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907,*

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Range 23—Continued.

along Candle lake trail, such as 'Fox plain,' in sections 29 and 32. The northeast, northwest and southeast corners of the township are heavily timbered with spruce and poplar, the remainder being covered with poplar and willow scrub interspersed with large hay sloughs. Several small streams were found crossing the township. Whitefox river flows out from a muskeg on the south boundary. The land appears to be suitable for mixed farming.—*R. H. Montgomery, D.L.S., 1906.*

52. This township is forty miles from Prince Albert, near Candle Lake trail, which is usually in bad condition for travel. The soil is from two to eighteen inches of black loam and is suitable for mixed farming. The surface is slightly rolling, covered with poplar and hazel, with a few scattered spruce and large clusters of spruce in sections 4, 9, 2, 11, and 12. Whitefox river is the source of water supply which is sufficient and permanent. A very few hay sloughs and with the exception of a little feed along the river and around a few small sloughs there is no hay. The land is not liable to be flooded. The climate is wet and cool at night with summer frosts. Poplar is the fuel, and is available any place. There are no stone quarries, or minerals of any kind. There are numerous deer and bear with a few partridges and ducks. Beaver are scarce, but there are still a few in Whitefox river. Fox plain is a large opening in section 29 west of the river. The surface is covered with scattered willow and swampy grass.—*A. L. MacLennan, D.L.S., 1907.*

Range 24.

4. This township was reached from township 4, range 23, by travelling westward along the second base line. The soil is of fair quality but the country is so broken in the south part that only the north two-thirds is suited for agricultural purposes. The surface is everywhere prairie with no timber. Fresh water of good quality is readily found in the numerous sloughs and marshes. Big Muddy creek crosses the southwest corner of section 6. At this point it is twelve links wide, eighteen inches deep and, at the time of survey (June) was flowing at about one mile per hour in well defined banks. There is no likelihood of flooding. There are no water-powers. The climate is moderate with no frosts at the time of survey. A little deadwood is found along the south boundary in the ravines which lead into Big Muddy bottom. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

51. I reached this township via Candle Lake trail to 'Fox plain.' The roads are very bad. The soil consists of from twelve to eighteen inches of black loam and is eminently adapted for mixed farming. The surface is slightly rolling, timbered with poplar to ten inches in thickness. There are several small hay sloughs, the water is slightly alkaline, and the supply is neither sufficient nor permanent. The land is not liable to be flooded. The climate is wet and cool at night with frosts during the summer months. Poplar is the available fuel and can be procured in any part of the township. There are no stone quarries, or minerals of any kind. There a few deer, bear, partridge and duck.—*A. L. MacLennan, D.L.S., 1907.*

52. I reached this township via Candle Lake trail to 'Fox plain.' The roads are very bad. The soil consists of from twelve to eighteen inches of black loam, and is eminently adapted for mixed farming. The surface is slightly rolling timbered with poplar to ten inches in thickness. There is a large muskeg in the southwest corner of the township. There are several small sloughs which yield a quantity of good hay. The water in the sloughs is slightly alkaline. The supply is neither sufficient nor per-

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 24—Continued.

manent, and there is no land liable to be flooded except that part already under muskeg. The climate is wet and cool at night with frosts during the summer months. Poplar is the available fuel and can be procured in any part of the township. There are no stone quarries nor minerals of any kind. There are a few deer, bear, partridge and duck.—*A. L. MacLennan, D.L.S., 1907.*

Range 25.

9. This township was reached from township 9, range 26, by travelling along the base line. The soil is of poor quality, being chiefly sand and gravel, and is unfit for agricultural purposes. The township is suited only for grazing. The surface is rolling and hilly prairie with no timber. Marsh grass and redtop are abundant in the numerous small hay marshes. Fresh water is easily found in the hay marshes and sloughs. No streams or water-powers are found, and the land is not liable to be flooded. At the time of survey (July) there was a violent storm with rain and hail but no frosts. No fuel, stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

51. This township can be reached from the Egg lake trail or the Candle lake trail, the latter is considerably shorter but in much poorer condition. The soil is suitable for mixed farming. The township is timbered with poplar, hazel, and mixed scrub with a few odd spruce. The shores of Egg lake are bordered with a hay meadow, which produces probably 1,000 tons of good hay each year. The water in Garden river is sufficient and permanent. This river is twenty-five feet wide and two feet deep. It runs over a gravel bottom at the rate of two to four miles an hour. The land is not liable to be flooded to any extent. There are several rapids in the stream but it is not practicable to develop any water-power. The climate is very wet and cool at night with frosts during the the summer months. The fuel is poplar, which can be procured any place. There is no coal, lignite, stone quarries nor minerals. There are a few moose, deer, bear, foxes, and lynx, while ducks are numerous. In sections 3, 10, 15, 22, a few hundred feet back from Garden river, is a high rolling surface covered with a light poplar scrub, the most suitable place for agricultural purposes in the township.—*A. L. MacLennan, D.L.S., 1907.*

52. I took the Candle lake trail from Prince Albert to 'Fox plain,' which is in township 52, range 23, and came west from that place. It is possible to reach this township from the Egg lake trail, both roads are very bad in the wet season; the latter is more preferable. The soil is suitable for mixed farming. The township is timbered with poplar, hazel and willow scrub. With the exception of the hay, which is of good quality in sections 5 and 6, there is very little pasture of any kind. The water in Garden river, which is the main source of supply, is sufficient and permanent. This river is twenty-five feet wide and two feet deep running over a gravel bottom, with a few large limestone boulders, at the rate of two miles an hour. The land is liable to be flooded in the vicinity of Garden river to the depth of two feet. There are a few rapids in the stream but the water-power available is practically nil. The climate is very wet and cool at night, with frosts all the summer months. The fuel is poplar, which can be procured any place. There is no coal, lignite, stone quarries nor minerals in the township. There are a few moose, deer, fox and lynx, while ducks are numerous.—*A. L. MacLennan, D.L.S., 1907.*

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Range 28.

9. This township was reached from township 9, range 27, by travelling eastward along the third base line. The soil is light, but would make fair farming land. The surface is everywhere prairie with no timber. A considerable quantity of marsh grass and redtop occurs in the numerous small hay marshes. Fresh water is found in the sloughs and marshes, and is easily obtainable. No streams nor water-powers occur and the land is not liable to flooding. The climate is moderate with no summer frosts. No fuel, stone quarries nor minerals were found. Duck was the only game seen.—*J. L. R. Parsons, D.L.S., 1907.*

45. This township is partly covered with small poplar and willow. The soil generally is sandy loam suitable for the production of wheat, oats and vegetables. There is no water-power, or minerals of economic value. Very little hay is in this township. There is a lake of about eighty acres in lots Nos. 11, 12, 13 and 14.—*E. W. Hubbell, D.L.S., 1907.*

49. We entered this township by crossing the ferry at Prince Albert and then followed a trail which leads to Candle lake. The soil except in one or two places is pure sand and not fit for agricultural purposes. The surface is rolling, hilly in places and nearly all covered with thick timber, principally jackpine varying in diameter from four to fourteen inches. There are several large clumps of poplar, but most of the good timber has been cut. Considerable timber is cut in this township to supply fuel for the city of Prince Albert and the district surrounding it. There is little or no hay in the township except in the northern portion along the north boundary. A good supply of water is obtainable from several sloughs, from a few creeks and from Little Red river, which is about sixty or seventy links wide, three to eight feet deep and flows at the rate of four or five miles an hour. This river is of immense value for lumbering, rising as it does many miles north of this township, flowing through it and emptying into Saskatchewan river in section 10. Great quantities of sawlogs were coming down at the time of survey (August) and several lumber camps were stationed along its banks. We did not perceive any falls or rapids, but doubtless considerable horsepower could be developed by the construction of dams. The water is fresh, but brackish. We had a little frost on August 24, and again on September 14. We did not notice any indications of coal, minerals or stone of importance. Saskatchewan river cuts off a portion of the southern part of the township, and a forest reserve embraces about nine square miles in the southwest corner. There are very few settlers in this township, mostly half breeds, who have small shacks situated along the banks of the Saskatchewan. We did not see any game, or hear of any, except a few beaver in Little Red river. All kinds of berries were plentiful. A good iron bridge crosses Little Red river in section 14.—*E. W. Hubbell, D.L.S., 1907.*

52. The route to the township is by the Egg Lake trail. The soil is from two to eighteen inches of black loam, suitable for mixed farming. The surface is gently rolling except in the northwest part of the township which is inclined to be hilly and is timbered with eight-inch poplar, a few twelve-inch Banksian pine and a few eight-inch spruce in the valley of Bittern creek in the northwest part of the township. Hay can be procured on the shores of Murray and Mertock lakes, but it is not of the best quality. Bittern creek is about fifteen feet wide and two feet deep. The water is sufficient, fresh and permanent. It runs over a gravel bottom at the rate of two miles an hour. The land is not liable to be flooded and there is no water-power. The climate is wet and cool at night with summer frosts. The fuel is poplar and is available any place. There are no stone quarries nor minerals of any description. There

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 26—Continued.

are a few moose, deer, bear, lynx, and muskrats, also a few partridge and numerous duck.—*A. L. MacLennan, D.L.S., 1907.*

Range 27.

9. This township was reached from township 6, range 30, by following the Moose-jaw-Wood mountain trail to the third base line and thence easterly. The soil is light but of fair quality, and is suited for agricultural purposes. The surface is everywhere prairie. No timber is found. Marsh grass and redtop of good quality are to be found in the numerous small hay marshes throughout the township. Fresh water was easily obtainable at the time of survey (July) in the sloughs and marshes which abound in the township. No streams occur and the land is not liable to be flooded. There are no water-powers. The climate is moderate with no summer frosts at the time of survey. No fuel, stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

41. The surface of this township is mostly rolling or hilly, being very hilly in the northwest corner, rolling in the north half of the northeast quarter, rolling along the south and west boundaries, and rolling to hilly in the interior and in sections 13, 14, 23 and 24. The greater part of the surface is covered or dotted with poplar bluffs, with large prairie openings. Nearly every section has timber in bluffs large enough for rough buildings, fencing and fuel. The heaviest belt is in sections 12 and 13, where the north half of section 12 and the south half of section 13 is almost one solid tract of poplar, mostly fine growing timber from four inches to twelve inches in diameter, which if it can be kept from destruction by fire, will furnish an immense amount of building material. This timber would be of great use and value to settlers in the townships to the south that have no timber. There is a large lake (water slightly alkaline) in sections 16, 17, 20 and 21 and one on the east side of sections 13 and 24. The water is fresh. Many sloughs are found all over the township, the greatest number being in the east half. The water is fresh in the majority of these sloughs. These water areas furnish the only natural drainage, there being no streams or hardly any other outlets. There is very little of the ground that is not good for cultivation or grazing. The soil is mostly a good sand loam on sandy and clayey subsoils. It will produce good wheat and other cereals. From the more or less broken surface of the ground it is not adapted to exclusive grain growing. Hay of good quality is to be had from around nearly all sloughs and on the low ground. No large quantity can be cut in one place, but there is sufficient to supply the needs of intending homesteaders. No water-power, stone quarries or minerals of economic value were found. Settlement is gradually decreasing game. Coyotes, skunks, muskrats and gophers are still plentiful. Traces of foxes, badgers, and jumping deer were seen. Duck and prairie chicken are plentiful in their season. Geese and sandhill crane were scarce.—*Wm. R. Reilly, D.L.S., 1906.*

42. The west half of this township is hilly. Through these hills, a comparatively level pass extends westerly in the south through sections 16, 17 and 18, westerly in the north through sections 21, 29, and 30 and northerly through the east half of section 33. The old Hudson's Bay Company's trail to Prince Albert runs through here. Through the other passes are farm trails. The southeast quarter is mostly rolling, the northeast quarter undulating to rolling. The west half and southeast quarter is thickly dotted or partially covered with heavy poplar bluffs and thick willow clumps and underbrush. The poplar is large enough for rough building purposes, fences, &c. The northeast quarter is mostly open country, with odd poplar bluffs and clumps of willow.

TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 27—Continued.

The soil is generally a good sand loam from four to ten inches deep on a sandy sub-soil. Some patches of clay loam were found along the north boundary and in other odd places. There are several large lakes in the township in the following sections: one in sections 12 and 13, one in section 6, one in section 7, one in sections 19 and 30, and one cutting the northwest quarter of section 31. The water in all these lakes is strongly alkaline. A number of small sloughs is scattered all over the township with water mostly alkaline. The original survey shows a large lake in the flat in section 28. This has dried up and is now a hay meadow. Hay of good quality can be cut in small quantities around nearly all sloughs and on the low ground. A large quantity can be cut south of the lake in section 12 and an immense quantity in the flats on sections 21, 22, 23, 26, 27 and 28. From these flats water seems to drain westward into the lake in sections 19 and 20 and eastward to Carrot river and, I believe, forms the source of that river. An old Hudson's Bay Company's trail to Prince Albert passes through sections 13, 24, 25, 26, 35, 34 and 33. It is not used to any great extent at present and is entirely obliterated in places. No water-powers, stone quarries or minerals of economic value were found. Coyotes, muskrats, skunks, gophers, ducks and prairie chickens were frequently seen while other game was scarce.—*Wm. R. Reilly, D.L.S., 1906.*

Range 28.

41. This is a fractional township adjoining the third meridian. The surface is rolling to hilly land, partially covered with clumps or large stretches of poplar. The northwest quarter of the township is comparatively open. In most cases the hills are not abrupt but rise with gradual slopes, and can be readily cultivated. Sloughs are not numerous but some are found on every section, the water being mostly alkaline. A lake was traversed in section 18. It is wooded on the south and west sides. A small creek from the hills on the south runs into the south end of this lake. The ground is rough around this end, while the water, except where the creek enters is strongly alkaline and not fit for stock. The soil is sand and clay loam, not class one but yet good farm land. The township is settled almost entirely by Galicians, nearly every homestead being taken up. These people are putting up good warm farm buildings. They are almost all built of logs plastered both inside and outside with mud, and whitewashed. The roofs are thatched with straw and some of them are exceedingly well done, making picturesque looking buildings. In a number of cases a large amount of land has been broken, but in the majority of cases a settler has only a small area under crop. The farm work is done mostly by cattle, the finest work cattle I have seen in the country. Threshing was in progress during the time of survey, (November). The grain was of good quality and the crops an average one. The season was favourable for farming, with frequent rains in July and June, very little summer frost and an exceptionally fine fall. A light snowfall, the first of the season, occurred on November 1, but it disappeared in a couple of days. A considerable quantity of hay can be cut around sloughs and on low ground. The district is best suited for mixed farming. An old cart trail to Prince Albert passes diagonally northwest through the township, but it is destroyed in places and very little used. Farm trails run in all directions, but as they have no particular beginning or ending they have not been noted. Poplar is found large enough for log building, fencing and fuel, and its value to the settler can hardly be estimated.—*Wm. R. Reilly, D.L.S., 1906.*

42. This, like township 41, is a fractional township adjoining the third meridian. It is very much like 41. The west half is rolling and the northeast quarter hilly. It is dotted with clumps and stretches of poplar with large prairie openings. The

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 28—Continued.

heaviest clumps are along the north and east boundaries. The southwest portion is comparatively open. There are very few sloughs on the greater part of the township. Sections 13, 24, 25, 26, 35 and 36, are much broken by sloughs and lakes. The soil is clay or sandy loam not of the best kind but good farming land. This township, like 41, is settled almost entirely by Galicians. The majority of homesteads have been taken up and in a number of cases a large amount of breaking has been done. The buildings put up by these people in townships 41 and 42, ranges 27 and 28, are similar, being built of logs, plastered inside and outside with mud, and whitewashed, the roofs being thatched with straw. They prove very warm substantial buildings. Seeding started early in the spring with fine weather. Frequent showers in June and July, good harvest weather and an exceptionally fine fall made it a good season for farming.—*Wm. R. Reilly, D.L.S., 1906.*

Range 29.

6. This township was reached from township 9, range 25, by following the trail from Regina to Wood mountain to the northeast corner of township 6, range 27, thence westerly. This trail was in excellent condition. The soil in the two north tiers of sections of the township is good and well-suited for agricultural purposes. The soil surrounding Montague lake is alkaline and stony and fit only for grazing. South of the lake the land is very hilly and broken and is also grazing land. The surface is prairie except a little scrub and small poplar which occur in the ravines along the south side of the lake. No timber is found. Fresh water was found at the time of survey (July) in the marshes and sloughs. A creek drains Montague lake to the southeast; it is twenty links wide and two feet deep near the lake, and at the time of survey was flowing very sluggishly between well defined banks. The land is not liable to flooding. No water-powers are found. The climate is moderate with no summer frosts. A small amount of firewood is obtained in the ravines along the south side of Montague lake. No stone quarries nor minerals were found. Duck was the only game seen.—*J. L. R. Parsons, D.L.S., 1907.*

20, 21 and 22. The western meridian through townships 20, 21 and 22, range 29, passes over a dry country without bush of any description, the surface of which is generally level to undulating. The soil is sandy loam, suitable for producing wheat, oats, barley, flax and vegetables. We passed through several immense areas of wheat fields in this district. The Canadian Pacific Railway Company have under construction a railway from Moosejaw to The Elbow, on the south branch of Saskatchewan river. It passes through section 30, township 20, range 29. When finished it will be undoubtedly of immense advantage to the surrounding settlers. We did not perceive many hay meadows. The sloughs passed contained surface water, generally, and later in the season became dry. We did not hear of summer frosts, nor did we notice indications of coal, stone quarries or minerals. There is no water-power, and no game except the feathered kind.—*E. W. Hubbell, D.L.S., 1907.*

Range 30.

4. This township was reached from township 5, range 1, by travelling southeast to Spring Creek ranch in section 13, township 5; thence by the ranchers' trail to telegraph line trail which crosses the south part of township 5, range 30. The soil is light and gravelly in many places and is best suited for grazing purposes. The surface is everywhere prairie. The east two-thirds of the township is hilly and rough

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TOWNSHIPS WEST OF THE SECOND MERIDIAN.

Range 30—Continued.

while the west one-third is rolling. There is no timber. Good marsh hay is abundant in the numerous small hay marshes throughout the township and in the valley of Haymeadow creek, which flows easterly through the south tier of sections. Fresh water was easily obtained at the time of survey (August) in the marshes and sloughs and in Haymeadow creek. No water-powers exist nor is the land liable to be flooded. The climate is moderate, with no frosts at the time of survey. No fuel occurs in the township, but a limited amount exists in the township immediately north. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

5. This township was reached from township 9, range 25, by following the police trail from Regina to Wood mountain. It was in good condition. The soil is light in quality, and on account of the broken nature of the surface is suited only for grazing purposes. The surface is rolling and hilly prairie, with no timber, broken on the north and west sides of the township by deep ravines in which small bluffs of poplar and willow occur. Hay of good quality is to be found in the small hay marshes in the township. Fresh water occurs in the marshes and in the two creeks. One creek runs northerly through the west (fractional) tier of sections; it is ten links wide, one foot deep and has a current of one and one-half miles per hour. The other joins this one from the east, draining a deep ravine in sections 35, 34 and 33. It is six links wide, one foot deep and has a current of one and one-half miles per hour. There is no water-power. The climate is moderate, with no frosts at the time of survey (July). Fuel consists of small poplar and willow occurring in the ravines along the north and west sides of the township. There is said to be lignite coal in all the hills, but none, however, was seen. There are no stone quarries nor minerals. Duck is the only game.—*J. L. R. Parsons, D.L.S., 1907.*

6. This township was reached from township 6, range 29. The soil is of good quality, suitable for agricultural purposes. The surface is level and rolling prairie with no timber. Good hay is found in the small hay marshes in the township. Water was plentiful at the time of survey (July) in the small marshes. There is no water-power in the township. There is no fuel but some wood can be obtained in township 5, range 30. No stone quarries nor minerals were found. The only game was duck.—*J. L. R. Parsons, D.L.S., 1907.*

17. (*Eastern Boundary*).—The surface of the east boundary of township 17, range 30, is generally rolling and undulating, but more broken and hilly at the south end. The soil throughout is sandy loam rated second class, suitable for growing wheat, oats barley, &c. There is no wood in this township. The main line of the Canadian Pacific railway crosses section 25. There are no hay meadows of any account and very little water. Good sweet water is obtained from a couple of small creeks. There is no water-power, nor did we see indications of coal, stone quarries or minerals.—*E. W. Hubbell, D.L.S., 1907.*

TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 1,

4. This township was reached from township 4, range 30, west of the 2nd meridian, by following the telegraph line trail westward. It was in excellent condition. The soil is of poor quality, there being a great deal of gravel so that the township is suited only for grazing purposes. The surface is prairie with no timber. It is very hilly and broken throughout. Hay of excellent quality, blue joint and red top, is

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Range 1—Continued.

found in abundance along the valley of Haymeadow creek, which crosses the township from northwest to southeast. Large quantities of hay are annually cut here by ranches of the district. Fresh water was to be found in the sloughs and marshes at the time of survey (August) and also in Haymeadow creek, which averages ten links wide, eighteen inches deep and flows with a current of one and one-half miles per hour. No water-powers occur. The climate is moderate, with no frosts at the time of survey. There is no fuel in this township, but a good supply can be obtained in the township to the north. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

5. This township was reached from township 5, range 30, west of the 2nd meridian, by following the old trail to Elm Springs and Wood mountain. It was in good condition. The soil is of good quality, supporting an excellent growth of upland grass. On account of the broken character of the country, it is suited only for grazing purposes. The surface is chiefly prairie with no timber, except some small bluffs of small poplar and willow in many of the ravines. The township is very rough and is broken by deep ravines which drain northward into the valley of Twelvemile lake. Numerous springs are to be found in the ravines and coulées, containing excellent water. These springs feed small creeks in each ravine which drain northward into Twelvemile lake. There are no water-powers, nor is the land liable to be flooded. The climate is moderate with no summer frosts. There is an abundance of wood in the township. Coal is found in many of the hills by ranchers of the district and mined for kitchen purposes. It is a low grade lignite and occurs in thin seams. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

6. This township was reached from township 5, range 30, west of the second meridian, by following the old trail to Elm Springs and Wood mountain. The soil in this township is of good quality and is fine rolling land, except along the shores of Twelvemile lake, where the land is cut by deep ravines to the north and south. There is no timber. A very fine hay meadow exists around the east end of Twelvemile lake. Good hay also grows in the numerous small hay marshes throughout the township. Good, fresh water was obtainable at the time of survey (July) in the marshes and sloughs and also in the south part of the township in the small spring creeks which drain the ravines and coulées. There are no water-powers. The climate is moderate with no summer frosts. There is no fuel in this township, but both wood and coal occur in the township to the south. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

7. The township is reached by a trail from Moosejaw which passes through township 10. The trail leads to Wood mountain and is in good condition. The soil is mostly clay loam and is well adapted for general farming. The surface is open prairie, without any timber. Sections 22, 23, 26 and 27 are mostly level and produce excellent hay. There are no springs or creeks in the township, but water could no doubt be obtained at a moderate depth by digging wells. The climate is favourable, summer frosts do not appear to prevail, while the average rainfall is light. There is no fuel supply within the township, but coal can be obtained about ten miles south, at Twelvemile lake. There are no stone quarries or minerals of economic value. Antelope were seen occasionally, but no other kind of game. With the exception of a large swamp on the northeast corner and another covering parts of sections 3 and 4, there is no waste land in this township. There are no settlers at present, but they will

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 1—Continued.

soon find their way into a desirable township such as this is.—*Geo. Edwards, D.L.S., 1906.*

8. The trail from Moosejaw to Wood mountain, passing through township 10, affords access to this township. This trail is in good condition. The soil is chiefly clay loam with clay subsoil, very suitable for agricultural purposes. The surface is rolling prairie without any timber. There are no hay areas of any account. As there are no springs or creeks, water can be obtained only from sloughs, or by digging wells. The average rainfall appears to be light. Other climatic conditions are favourable, and summer frosts would not be likely to prevail. There is no apparent fuel supply nearer than township 6 where coal can be obtained. There are no stone quarries or minerals of economic value. Antelope were seen frequently. Ducks frequent the sloughs in considerable numbers. There are no settlers at present, but this township will soon be occupied as it is well suited for farming purposes. There is no waste land, except a large slough covering parts of sections 26, 27, 35 and 34.—*Geo. Edwards, D.L.S., 1906.*

9. A good trail, from Moosejaw to Wood mountain, passes through township 10, range 1, and affords the most convenient means of access to this township. The soil is clay loam with clay subsoil, suitable for general farming. The surface is unbroken rolling prairie, without any timber whatever. At the time of survey (October) there was no means of determining existence or extent of hay areas, as all vegetation had been destroyed by a recent prairie fire. The only water available is in three small sloughs. There are no springs or creeks. The average rainfall is light, no summer frosts occur, while other climatic conditions are favourable. Fuel is not obtainable nearer than township 6, where coal is found. There are no stone quarries and no minerals of economic value. Antelope were seen occasionally. Ducks were the only other kind of game observed. I have rated this township third class throughout on account of it being stony.—*Geo. Edwards, D.L.S., 1906.*

10. Telegraph line trail from Moosejaw to Wood mountain passes through this township. This trail is in good condition. The soil is largely clay or clay loam suitable for agricultural purposes but stony in many places. The surface is open prairie with no timber of any kind. There are no springs or creeks, the only water being what can be obtained in a few small sloughs. Good water could, no doubt, be obtained by digging wells. A recent prairie fire destroyed all vegetation so that no hay was to be seen. Average rainfall is light, summer frosts are not usual while other climatic conditions are favourable. The nearest available fuel supply, at present, is in township 6, range 1, where coal can be obtained. There are no stone quarries, and no minerals of economic value. Antelope and a few duck were the only game noticed. This township is better adapted for grazing purposes than general farming. Owing to most of the land being stony I have rated it all as third class.—*Geo. Edwards, D.L.S., 1906.*

11. A good trail from Moosejaw to Wood mountain passes through the southeast corner of this township. The soil is mostly clay, not very good for farming but affords good pasturage. The surface is open prairie somewhat hilly in places but for the most part rolling. There is no timber. A recent prairie fire destroyed all vegetation so that no hay areas could be located. There are no springs or creeks. The average rainfall is light, summer frosts are not common, while other climatic conditions are good. The nearest apparent fuel supply is in township 6, range 1, where coal is found. There are no stone quarries and no minerals of economic value. No game was seen except

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Range 1—Continued.

an occasional antelope. There are no settlers in this township. The land is suitable for grazing purposes, but too rough and stony for agricultural purposes.—*Geo. Edwards, D.L.S., 1906.*

21. This township may be reached by a graded and well travelled road from either Mortlach or Caron, stations on the main line of the Canadian Pacific railway. A number of houses forming the nucleus of a town called Brownlee lies only a couple of miles southeast of the southeast corner of this township. The soil consists of a black loam with generally a clay subsoil. The surface is an open undulating prairie without any timber or brush whatever. In a fairly dry season there are numerous small hay marshes scattered through this township, but when the seasons are very wet hay can be cut on the uplands. Water of a fair quality is found in the most of the ponds but many settlers have sunk wells. At times the water is somewhat alkaline. There are no running streams or water-powers. The climate is normal and no summer frosts were experienced. Fuel has to be imported from the nearest railway towns, Caron and Mortlach, distant twenty-three to twenty-five miles. There are no stone quarries but sufficient stone may be gathered for necessary building purposes. No minerals of economic value were observed. Game is scarce, in fact none was seen. The graded roadbed of the Moosejaw northwestern branch of the Canadian Pacific railway cuts diagonally through the southern half of this township, coming from Tuxford it also passes through Brownlee. The ironing of the grade from Tuxford is not yet completed. This township is well settled and all the homesteads occupied.—*C. F. Miles, D.L.S., 1907.*

22. This township is approached by several well beaten trails running from the small but thriving towns on the nearest railway, distant from 25 to 30 miles. The soil in the northern part of the township is sandy loam, but towards the south there is more clay. We saw several excellent crops of wheat and oats which the soil is apparently well adapted for. Vegetables also appeared to be grown with equal success. The soil is undulating to rolling, and extending across the centre of the township from the east to the northwest is the Qu'Appelle valley, averaging about a mile in width and from sixty to eighty feet deep, through which flows the Qu'Appelle river, although at the time of survey (September) it was dry in most places. The only wood in the township consists of a few clumps of small poplar and willow growing in some of the ravines, but it is not even used for firewood, as the settlers burn coal which they bring from the nearest railway stations. Hay is procured from a few dry sloughs, but principally from the bottom land in the Qu'Appelle valley. There are no lakes in this township. Drinking water is very scarce, in fact the only place we found any was in the northeast quarter of section 12, where there is a small spring. There is no flooded land, and from what we could learn no summer frosts are likely to do damage to any extent. We did not perceive any signs of lignite or seams of coal, nor were there stone quarries, but on many ridges in the northern part of the township numerous huge boulders and outcroppings of stone were quite apparent, also in various places we found considerable gravel. The nearest postoffice is Hustler, situated in township 22, range 29, fifteen miles distant from Craik, from which the mail is brought once a week. With the exception of a few antelope and numerous wild ducks we did not see any variety of game. I learned that all the land available for homesteading was taken and many new buildings are being erected. The Walsted ranch is situated in section 24 in this township, and has two hundred head of stock.—*E. W. Hubbell, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 1—Continued.

24. This township may be reached by a good graded road from the village of Craik, a station on the Canadian Northern railway, Craik being about seventy-two miles from Regina. The soil generally is a black loam, varying in depth from four to twelve inches, four inches predominating, underlaid mostly by a sandy clay. The surface is an undulating and gently rolling, open prairie without any timber or brush whatever. There are a number of marshes scattered over the township, which in ordinary dry seasons are available for making hay. The only water to be found is in ponds, although the settlers now have wells, the water in some instances being slightly impregnated with alkali. There are no running streams and no water-powers. The climate is normal and summer frosts not general. There being no timber, coal has to be procured from Craik, or wood from the sand hills about ten miles to the west. There are no stone quarries, although stones or boulders may be found in sufficient quantities for local building purposes. No minerals were observed. Game is scarce, although an occasional antelope is still to be seen. This township is pretty well settled, and no more homesteads are available.—*C. F. Miles, D.L.S., 1907.*

33. The southwest corner of the township is hilly, the remainder of the south half varies from rolling to hilly and the north half is hilly. It is all open prairie. The surface is broken by sloughs and lakes, the water in nearly all of which is more or less alkaline. The lake in section 7 has banks from ten to twenty feet high, sand and gravel shore, sand bottom and fresh water. A creek from the hills to the south runs into this lake; it was dry however at the time of survey (August). Of the five lakes traversed this is the only one containing fresh water. The lake in sections 1 and 12 has a large slough or marsh, on the west side extending with many crooks nearly across the south half of section 11. The lake in section 14 has a slough on the west side of it extending into section 15. A large swamp covers a part of sections 8, 9, 16, 17 and 18. At a short distance it appears to be one mass of reeds, but there is a considerable area of open water in it. The reeds afford cover for ducks and other water fowl which gather there in great numbers. The water is shallow but as it lies in a depression there is apparently no easy way of draining it. A quantity of hay can be cut around many of the sloughs and in many places on the upland. The soil is good clay or clay loam and produces good crops. I think that for farming this is the best of the four townships surveyed in this district. The main line of the Grand Trunk Pacific railway cuts the north half of section 36. Nearly all homesteads have been taken up and a large area is under crop considering the short time since settlement started in the township. The close proximity to the main line of the Grand Trunk Pacific railway has increased the value of the land and added much to the prospects of the settlers.—*Wm. R. Reilly, D.L.S., 1906.*

34. This township is very much like those to the south and west of it. It is rolling prairie with many sloughs in which the water is more or less alkaline. A lake was traversed in sections 27 and 28. It has a soft clay shore, and the water is strongly alkaline. The soil is mostly a rich clay loam, with a clay subsoil. It produces excellent grain and other crops. Hay is not found in large areas, but nearly all the sloughs produce some, and on a number of the upland flats a large quantity was cut this year. The season was a very favourable one for farming, there being frequent showers in the early part of the season. Some extra heavy thunder storms occurred in July, but crops were not damaged to any great extent. The settlement is new but excellent progress has been made in breaking up the land. A number of first class dwellings were built this season and in many ways the district has the appearance of a much older settled country. The main line of the Grand Trunk Pacific railway

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Range 1—Continued.

cuts the township diagonally from the southwest corner of section 1 to the northwest corner of section 18. This has increased the value of the land and added much to the prospects of the settler.—*Wm. R. Reilly, D.L.S., 1906.*

35. The soil of this township is generally sandy loam with a clay subsoil, suitable for the production of wheat, barley, flax, oats and vegetables. The surface is mostly undulating, being more rolling towards the northern part, and is destitute of timber or bush of any description. There is scarcely any hay except that obtained from the large marshes in sections 2, 9, 10, 16 and 20. The settlers content themselves with prairie grass or 'wool top.' Most of the water obtained from wells, which are 20 to 50 feet deep, has an alkaline flavour. However as there are several comparatively large bodies of fresh water throughout the township, the supply is permanent and more than sufficient. As far as we could ascertain the land is not liable to be flooded and summer frosts are of rare occurrence. The settlers, generally, use coal for fuel, hauling it from Davidson or Saskatoon, from thirty to thirty-five miles distant. Some wood is procured from the hills to the northeast about twenty miles distant, but as this section of the country is being rapidly homesteaded, the supply obtained from this district will naturally cease. We did not observe any indications of lignite veins, coal, minerals nor stone in sufficient amounts for quarrying. The only game is of the feathered variety and these were quite plentiful this year, except prairie chickens. This township is well settled and a considerable portion is under cultivation. The Canadian Pacific railway runs across sections 12, 11, 10, 9, 8, 17 and 18. As yet it is only graded but the rails are expected to be laid very soon. The town of Elstow, situated in sections 3 and 10, is making fair progress and doubtless in a short time will be a town of importance, as it is surrounded by a splendid agricultural country, and it is about the right distance from Saskatoon.—*E. W. Hubbell, D.L.S., 1907.*

37. This township is open prairie, very hilly on the south and west sides, rolling to hilly on the north and east sides and depressed in the interior. It is very much broken by lakes and sloughs in which the water is mostly fresh. The soil in all parts of the township is good. It is mostly a rich sand or clay loam. Hay cannot be said to be plentiful for a township that has so many sloughs. A large amount can be cut around sloughs and on the low ground but no great quantity in any one place. A large fresh water swamp stretches nearly across section 26. It is very much like the swamp in township 33, range 1. A heavy growth of reeds covers almost the whole area. There are only a small number of homesteads in this township that will make good grain farms. The greater portion, being either hilly or broken by water areas, is not a desirable location for the majority of settlers whose chief aim appears to be grain growing. This ground supports a good growth of grass and, with abundance of fresh water, makes a splendid grazing country. All the good homesteads have been taken up and considerable improvements made on some of them. This season with abundance of rain and little damage by frost or hail was a favourable one for farming. A ravine on the north side of section 35 has a little scrub in it, the only wood in the township.—*Wm. R. Reilly, D.L.S., 1906.*

38. The surface is open prairie, flat in sections 31, 32, 33, 34, 35 and 36, but gradually becoming rolling or hilly in the next tier of sections, while from the south it is all rolling or hilly, and stony on many of the side slopes and ridges. The soil is mostly a rich clay loam on a clay subsoil. The soil of the sections on the north side of the township is first class. Some quarter sections scattered over the township will make good farms, but the greater part is rather too rough or too stony for cultivation. A number of sloughs and lakes are dotted all over the townships,

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 1—Continued.

the water in the majority of them is fresh. Eight water areas were traversed. A pumping station on the side of lake No. 6 in section 33 supplies the water tank on the Canadian Northern railway at Vonda. All the desirable homesteads have been entered for, and most of them well improved. Owing to the short distance from the railway many of the poorer homesteads will be taken by those who will not go far from the railway to settle. A ravine in section 21 has a quantity of poplar and willow scrub in it. The lake in sections 14 and 23 is fringed with poplar and willow scrub, except the north side which is bare. Scattered clumps of poplar are dotted over sections 10, 11, 12, 13, 14, 15, 23 and 24. The season was a very favourable one for farming, sufficient rain, very little frost and very fair harvest weather.—*Wm. R. Reilly, D.L.S., 1906.*

52. There is a road from Prince Albert to the Sturgeon Lake Lumber Company's mill, whose buildings are on sections 22 and 27 of this township. The road is in fairly good condition. The surface of the township is timbered with poplar and spruce. The better spruce is cut, but there is still some small 12-inch spruce in the vicinity of Big Belly lake. There is no hay to speak of in this township. The water is fresh and the supply is sufficient and permanent. There is no land liable to be flooded. There is no water-power. The fuel is poplar and dry spruce and can be procured in almost any part of the township. There is no coal or lignite, stone quarries or minerals of any kind. There are a few moose, deer, bear, foxes, lynx and numerous muskrats. Partridges are scarce but duck plentiful. Bell lake, north of this township, is locally known as Shoal lake. It is a shallow, soft bottom lake, whose shores are bordered with swamp grass and brushes.—*A. L. McLennan, D.L.S., 1907.*

Range 2.

4. This township was reached from township 4, range 1, by following the police trail along the government telegraph line from Willowbunch to Wood mountain. It was in good condition. The soil is of poor quality, being gravelly and stony in many places and is suited only for grazing purposes. The surface is chiefly rough and broken prairie with no timber except small scrub poplar and willow on the north slopes of many of the ravines. Good fresh water was readily found in marshes and sloughs at the time of survey (August) and also in the creek which crosses sections 19, 20, 21, 27 and 34 on its way to Twelvemile lake. The land is not liable to be flooded. No water-powers occur. The climate is moderate, with no frost at the time of survey. Firewood is plentiful in the ravines and small seams of coal are readily found by the ranchers a few feet below the surface. It is lignite of low calorific value, but burns in an ordinary cook-stove. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

5. This township was reached from township 4, range 1, by following the police trail along the government telegraph line. It was in good condition. The soil is light with a considerable amount of sand and gravel and on account of the uneven surface is suitable only for grazing. The surface is everywhere hilly and broken prairie, with no timber. Hay is plentiful in the numerous small hay marshes throughout the township. Good fresh water was to be found in the sloughs and marshes at the time of survey (August) and also in the creek which enters the township from the south in section 3, and flows north into Twelvemile lake. It averages ten links wide, one foot deep and was flowing very sluggishly at the time of survey. The land is not liable to be flooded and no water-powers occur. The climate is moderate, with

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 2—Continued.

no frosts. Deadwood is to be found in the township to the south, and the ranchers state that lignite coal exists in many of the hills in the township. It is the characteristic low grade variety of the district. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

5, 6, 7 and 8. (*Boundaries*).—Township 5 is exceedingly rough and altogether unfit for agricultural purposes. There are numerous springs of good water and general conditions are favourable for ranching purposes. The southern part of township 6 is rough and hilly. It is traversed by Twelvemile lake, the water of which is alkaline. This township affords favourable conditions for ranching, but a large part of it is too rough for cultivation. Coal is found in this township on the south side of Twelvemile lake. Township 7 is well adapted for agriculture, there being very little waste land. There are no streams or springs, but water could doubtless be obtained by digging wells. There are no settlers here at present. Township 8 has a gently undulating surface, and would make good farming land. There are no springs or creeks, but water could doubtless be obtained by digging wells.—*Geo. Edwards, D.L.S., 1906.*

7. This township was reached from township 11, range 10, by following the old trail eastward to the provincial government bridge across Wood river in township 11, range 4. The trail was in good condition. The soil in the northeast, one-third of the township, is of fine quality and is good farming land. The soil in the remainder of the township is lighter and better suited for grazing purposes. The surface is prairie throughout. The northeast one-third of the township is gently rolling, while the remainder is more rolling and hilly. No timber occurs. Hay is plentiful in the numerous hay marshes throughout the township. Good fresh water was plentiful at the time of survey (October) in the small sloughs and marshes in the township, and settlers were able to find water by digging twelve feet. No water-powers occur. The climate is moderate, with slight frosts at the time of survey. No fuel, stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

8. This township was reached from township 7, range 2, by following the telegraph line trail. It is in good condition. The soil is of excellent quality and well suited for agricultural purposes. The surface is level and gently rolling prairie with no timber. A small amount of hay is found in the hay marshes. Fresh water was scarce at the time of survey (October), and was to be found only in the small marshes. No creeks nor water-powers occur. The climate is moderate, with frosts at the time of survey. No fuel, stone quarries nor minerals were found. Antelope was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

9. This township was reached from township 8, range 2, by following the telegraph line trail northward. It was in good condition. The soil of the west three-quarters of the township is of good quality, while the remainder is lighter, but the whole is suited for agricultural purposes. The surface is level and rolling prairie with no timber. A little hay is found in the few scattered hay marshes. Water was very scarce at the time of survey (October), and was only to be had in a few scattered marshes. No creeks nor water-powers occur. The climate is moderate with frosty nights at the time of survey. No fuel, stone quarries nor minerals were found. Antelope was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

10. This township was reached from township 9, range 2, by following the telegraph line trail northward. It was in excellent condition. The soil is of good quality. There is a good deal of gumbo in the township which is very stiff to break, but otherwise it is

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 2—Continued.

good agricultural land. The surface is gently rolling prairie with no timber. Hay is plentiful, occurring in the numerous small hay marshes, and also around the large marsh situated in sections 35 and 36. Water was scarce at the time of survey (October), but was obtained in a few of the marshes. No creeks nor water-powers occur. The climate is moderate with slight frosts at the time of survey. No fuel, stone quarries nor minerals were found. Game consists of duck and antelope.—*J. L. R. Parsons, D.L.S., 1907.*

11. This township was reached from township 5, range 3, by following the old Wood mountain trail, northerly, through range 3 to township 10. It was in good condition. The soil is of fair quality and suited for agricultural purposes. The surface is rolling prairie with no timber. Hay is plentiful in the numerous small hay marshes throughout the township, and in the large hay marsh which occupies the south half of sections 1 and 2. At the time of survey (August) water was scarce, but obtainable in a few marshes. No creeks nor water-powers occur. The climate at the time of survey was moderate with no frosts. No fuel, stone quarries nor minerals were found. Game consists of antelope and duck.—*J. L. R. Parsons, D.L.S., 1907.*

12. This township was reached from township 11, range 2. The soil is of fair quality, supporting a good growth of grass and is suited for agricultural purposes. The surface is rolling prairie with no timber. Good hay is to be found in the small hay marshes through the township. Water was scarce at the time of survey (August) and was to be found only in the deeper marshes, which had not dried out. There are no creeks and no water-powers. The climate is moderate with no frosts. No fuel, stone quarries nor minerals were found. The only game was antelope and duck.—*J. L. R. Parsons, D.L.S., 1907.*

21. This township is approached by several well beaten trails from the east and south connecting with the main trails running to the different towns which are situated on the various railway lines, twenty to twenty-five miles distant. The soil is generally sandy clay, suitable for growing wheat, barley, oats and vegetables, of which I saw several excellent crops. The surface is generally undulating, and in a few places rolling prairie. There are a few isolated hills situated in sections 26, 32, 33 and 18. The one in section 26 is known as Eyebrow hill from its peculiar shape, and is about seventy feet high. There is very little water. A small spring in section 27 was the only one noticed; the creeks and sloughs being all dry at the time of survey (September). However the settlers in this township have numerous wells from which a supply of excellent water is obtained. There is no timber or bush of any description in this township, so that the settlers have to burn coal which is obtained at the nearest railway stations. A small amount of hay is obtained from the bottom lands and a few of the dry sloughs, but the supply is limited. There are no lakes or sloughs and from what I could learn, there are no summer frosts that do any material injury. We did not perceive any signs of lignite or coal seams. The nearest postoffice is Hustler, situated in township 22, range 29, west of 2nd meridian, to which the mail is brought once a week from Craik, fifteen miles distant. We did not notice any stone quarries, but observed many boulders scattered on the hill tops. The proposed route of the extension of the Canadian Pacific railway from Moosejaw to the Elbow runs across the northern part of this township and when finished will be a great boon to the numerous settlers in this vicinity, especially as they are forming a village in this township.—*E. W. Hubbell, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 2—Continued.

22. This township can be reached by several well travelled trails from towns situated on the nearest railways and distant thirty-five to forty miles. The soil is generally sandy clay intermixed occasionally with a little gravel. We came across several excellent crops of grain, principally wheat; thirty-eight bushels to the acre was threshed off about eighty acres, on the northeast quarter of section 10. The surface is generally undulating to rolling but is slightly hilly in the west half of the township. There are two springs in this township, situated in sections 1 and 16 respectively and the water is fresh and sweet although in very hot weather the supply is limited. Water is also obtainable from Eye lake in sections 2, 3, 10 and 11, also from a lake in the east half of section 5. Otherwise the country is rather dry. There is no wood of any description except a little poplar in the east half of section 36, which has been culled over and over again. The settlers burn coal, although some obtain a little wood from the sand hills to the north. Hay is very scarce, a limited amount being obtained from a few dry marshes. Wool top and straw are generally used by the settlers as fodder for their stock. There is no flooded land and I believe no summer frosts that do any material damage. No sign of lignite veins or coal were noticed nor are there stone quarries. There are several trails passing through this township; one of them is the old and well travelled trail to Saskatoon, which is, however, gradually getting ploughed up in places. The nearest postoffice is Hustler, situated in township 22, range 29, and distant fifteen miles from the town of Craik, from which place the mail is delivered once a week. The original survey was fairly well done, except for a few miles which had to be entirely resurveyed and the old mounds of which had to be destroyed. All the homesteads are taken up and improvements were noticed on nearly all of them, as well as upon the odd numbered sections. This is a well settled and apparently a prosperous agricultural district.—*E. W. Hubbell, D.L.S., 1906*

23. That portion of this township lying south of Qu'Appelle river can be easily reached from projected stations on the new Moosejaw Northwestern branch of the Canadian Pacific railway, which, although graded, had not been ironed at the time of survey. That part lying to the north of the Qu'Appelle valley may be reached by fair roads from Craik, a station on the Canadian Northern railway. In the greater part of this township the soil consists of light and sandy loam with sometimes a clay subsoil. The sections however in the northeast and southwest corners are of a black loam suitable for raising any indigenous crops. The surface in the northeast and southwest corners is somewhat rolling but a good deal broken in the central parts from the northwest to the southeast corners. It is all open prairie except in the valley of the Qu'Appelle, where it is somewhat scrubby. There is no timber. There are but few hay marshes, the hay having to be procured from the uplands. There is plenty of water, but not of very good quality, except in wells sunk by some of the settlers. There is no current in the river nor in Eyebrow lake, nor are there any water-powers. Fuel has to be brought from the sand hills to the northwest or from the nearest railway stations. No stone quarries or minerals were observed. The best lands in the township, I believe, have already been taken up, although not all occupied.—*C. F. Miles, D.L.S., 1907.*

24. This township may be reached by a graded road from the village of Craik, a station on the Canadian Northern railway distant from Regina about seventy-two miles by rail. There are several elevators here and a daily train service. Some of the settlers in the westerly portion of this township trade at Girvin, and others at Davidson, both villages on the same line of railway. The soil in the easterly portions is generally a black loam with a clay subsoil, whereas the westerly smaller part is more

TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 2—Continued.

of a sandy nature, with nearly a pure sand in some of the westerly tier of sections. The surface is undulating and open prairie, except the southwesterly quarter which is partly covered with a dense growth of scrub and brush—being a part of the sand hills extending in here from the west. It is a comparatively dry township. The hay is got from the uplands or dry beds of marshes. The water in the ponds is frequently alkaline, but many settlers now have sunk wells from which they draw their supply of water. There is a lake on sections 8 and 17, from which there is a flow at times of high water. There are no water-powers in the township. The climate is normal and no summer frosts were experienced, in fact settlers maintained that no summer frosts had occurred since they settled there. There is some timber in the sand hills to the west, from which much of the fuel supply is procured, but in course of time it will have to be imported from the nearest railway stations. All the poles that have been used for building purposes have also been drawn from the adjacent township. There are no stone quarries, but sufficient stone may be gathered for local building purposes. No minerals were observed. Antelope and deer are still to be found in the hills, and put in an occasional appearance. Prairie chickens appeared still to abound in the brushy parts after the cold weather set in. This township is well settled and the homesteads in the open parts are all occupied.—*C. F. Miles, D.L.S., 1907.*

33. The southeast quarter of the township is from rolling to hilly prairie, most of the hills and ridges and many other parts being stony. The soil is good clay loam, but on account of broken surface and stones, the greater portion of this part of the township is best adapted for grazing. The southwest quarter and the north half of the township are rolling prairie. The soil is mostly a good clay loam running into sand loam at the northwest part of the township. Sloughs are found all over the township with water more or less alkaline in all of them. No extensive hay meadows exist, but hay in small quantities can be cut around nearly all sloughs and in many places on the upland. A traverse was made of four water areas and the water in all of them was found to be strongly alkaline. With the exception of the southeast part, this is a good township for farming. The homesteads are nearly all taken up and good progress has been made in developing them. The building of the Grand Trunk Pacific railway has increased the value of land and added much to the prospects of the community. The season was a very good one for farming. There was sufficient rain and little damage by frost or hail in this township.—*Wm. R. Reilly, D.L.S., 1906.*

34. This township varies from rolling to hilly prairie, there being very little level land. There is no wood of any kind. There are patches of alkali land in the majority of the sections, the largest stretches being in the north part of sections 31, 32 and 33. This township is dotted all over with sloughs containing water more or less alkaline. One lake was traversed in sections 15 and 16, and one in sections 7 and 18. The water in the former is slightly alkaline, and in the latter it is so strongly alkaline that stock will not drink it. The soil is generally a good clay loam, but is somewhat alkaline in the lowlands. It produces first class grain and other crops. Hay is not plentiful, but a considerable quantity can be cut in many places. Settlement started in this township less than four years ago, but it has many appearances of an old settled district. A large amount of improvements has been done this season. The season was an excellent one for farming, there being an abundance of rain, little or no damaging frost, and very slight damage on account of hail. The survey of the main line of the Grand Trunk Pacific railway cuts the township from sections 13 to

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 2—Continued.

31. The advent of this road has greatly advanced the price of land and added fresh impetus to the settlers. A very prominent hill which can be seen for many miles is on the southeast quarter of section 16.—*Wm. R. Reilly, D.L.S., 1906.*

38. The surface is from rolling to hilly prairie. The township is cut diagonally by a range of hills from sections 6 to 36. The southeast portion is hilly with many sloughs containing mostly fresh water. The greater part of this portion of the township is stony, sections 2, 3, 4, 5, 9 and 10 being very stony. A flat at the foot of the hills has a succession of sloughs from sections 7 to 35. The ground gradually rises westward from the flat. The northwest part is all rolling. The soil is mostly a rich clay loam with clay subsoil. The northwest part is splendid farming land. Some quarter sections south of the flat and along the east side of the township are very good, but the greater part of the south of the township is unfit for cultivation. Small quantities of hay, can be cut in many places, but no large amount in any one place. The original plan shows an old cart trail, crossing the township. This has been ploughed up in many places and is nearly blotted out. The township has farm trails in all directions but as they are of no importance they were not noted. The main line of the Canadian Northern railway curves a short distance into sections 33, 34 and 35. The climate was favourable for all classes of farming with frequent rains through June and July, little or no summer frost and very good harvest weather.—*Wm. R. Reilly, D.L.S., 1906.*

52. The surveyed trail to Montreal lake passes within a few miles of the Sturgeon Lake Lumber company's mill, which is in section 22 of the township immediately east; the trail to the mill is good but the bush road from the mill is not in good condition. The nature of the soil would permit of good mixed farming. The surface is slightly rolling, covered with poplar and thick hazel. The north shore of Von Mehern lake is bordered with first class spruce from six to thirty inches in thickness. There is a small quantity of hay on the south shore of Von Mehern lake and also on the shore of Cox lake; the quality is coarse. There is a sufficient and permanent supply of fresh water. Some of the smaller sloughs are slightly alkaline. The streams are small and not liable to flood the adjacent land to any appreciable extent. The climate for this summer was exceptionally wet and very cool. We had ice during the months of June, July, August, September, October, November and December. Poplar for fuel is most readily available and can be procured in any part of the township. There are no stone quarries, or minerals of any kind. Red deer, cotton tail, bear and partridges exist but are very scarce; muskrat, foxes and lynx are more numerous, also innumerable black ducks.—*A. L. MacLennan, D.L.S., 1907.*

Range 3.

5. This township was reached from township 5, range 2, by travelling westward along the 2nd base line. The soil is of good quality and the greater part of the township is suited for agricultural purposes. The surface is level or rolling prairie except along the east branch of Wood river, where it is rough and broken. No timber occurs. Good hay is found in the small hay marshes and in the valley of the east branch. Fresh water was obtainable at the time of survey (August) in the small sloughs and marshes, also in the east branch of Wood river which crosses sections 4, 9, 16, 15, 22, 27 and 33, in its northerly course; it averages eight links wide, one foot deep, and has a current of one mile per hour. No water-powers occur. The climate is moderate with no frosts. There is no fuel in the township but wood and coal are both obtain-

TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 3—Continued.

able in the township to the south. No stone quarries nor minerals were found. Duck was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

11. This township was reached from township 12, range 2, by following the settler's trail westward to township 11, ranges 4 and 5. It was in good condition. The soil is of fair quality and adapted for agricultural purposes. The surface is level and rolling prairie except the easterly tier of sections which are hilly prairie. There is no timber. Hay is scarce in this township. A small amount is found in the small hay marshes in the north part of the township. Water is not plentiful but at the time of survey (September) was obtainable in small marshes in the north part of the township. No creeks nor water-powers occur. The climate is moderate with no frosts. No fuel, stone quarries nor minerals were found. Antelope was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

12. This township was reached from township 11, range 2, by following the old Qu'Appelle trail westerly. It was in good condition. The soil is of good quality, but on account of the hills the land is suitable for grazing purposes only. The surface is rolling and hilly prairie with no timber. A little hay is to be found in the small hay marshes scattered through the township. Water was to be had at the time of survey (September), in the small sloughs and marshes. There are no creeks and no water-powers. The climate is moderate with no frosts at the time of the survey. No fuel, stone quarries no minerals were found. The only game was antelope.—*J. L. R. Parsons, D.L.S., 1907.*

51. This township was reached by the Sturgeon lake trail from Prince Albert. When we went out part of the trail was very wet so that we had great difficulty in getting to our township, but later on the trail was dried up, so that it was fair for travelling on. This township we found to be a very difficult one to survey as the entire surface is covered with timber and scrub. It was also very wet so that we could make little progress in our work, owing to the thickness of the undergrowth and the numerous ponds and lakes. There are ten large lakes which we traversed, two of which are over two miles long. The water in these lakes is fairly good, there being only a little alkali in them. The soil is generally good, being clay or clay loam, which if brought under cultivation would make good farming land, but, though there would be some trouble in clearing it up, it would repay. There is not much timber that would be of commercial value but it would be suitable for small buildings. There is a fair sized stream but it has no water-powers on it. The climate is fair, but at present owing to the dense growth of wood, &c., it would seem to be subject to frosts that would be injurious to crops. Yet if cleared up the frosts might not exist. There is plenty of fuel in the timber now growing, but there are no indications of coal or any mineral of any kind. There are some deer, and other kinds of game, but not very numerous. Taking the township as a whole there are a good many desirable sections for settlement.—*James Warren, D.L.S., 1907.*

Range 4.

1. There is a trail from Moosejaw running south of Johnston lake leaving the Wood mountain trail at the east end of the lake and crossing the east boundary of section 24. There is also a trail from Mortlach which runs to a squatter's house on section 4, township 12, range 4. The soil is clay or clay loam and suitable for farming. The land along the creek is broken and scrubby and more adapted for stock raising and mixed farming. The remainder of the township is a level or gently rolling prairie. There are no timber and no hay sloughs but there is considerable

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 4—Continued.

good prairie hay. The streams are the only permanent water supply of the township, the largest being Wood river. It is from fifteen to sixty feet wide but the current is sluggish, and during the fall and winter it is practically dry except for standing water. Power could be developed only for a small portion of the year. There were no summer frosts up to the time of completion of survey (July.) There is a little wood along the streams but there are no lignite or coal veins in the township. There are no stone quarries or minerals of economic value known. There are ducks and chicken along the creek and a few deer along the streams in sections 22 and 27. —*Chas. M. Teasdale, D.L.S., 1907.*

12. This township was reached from township 12, range 3, by following the old Qu'Appelle trail westerly. The soil is of good quality and is excellent agricultural land. The surface is rolling prairie with no timber. Hay is scarce in this township. A little is to be had where the valley of Wood river widens out. Good fresh water is to be found in the river. The junction of the south and middle forks occurs in township 11, range 4, and the river flows northward in township 12 through sections 2, 3, 9, 10, 15, 16, 22, 27, 28, 29 and 32. It is joined in section 32 by the north branch in which however there was no water at the time of survey (September.) This stream averages twenty-five links wide, three feet deep and has a current of one and one-half miles per hour. No water-powers occur. The climate is moderate with slight frosts at the time of survey. Fire wood sufficient for the needs of the settlers for several years is to be found along the river. No stone quarries nor minerals were found. Antelope and duck were the only game seen. —*J. L. R. Parsons, D.L.S., 1907.*

50. This township was reached by a trail cut through woods from township 51, range 3, which was very rough and difficult to make. This township is largely timbered with jackpine, spruce and young poplar. The soil is chiefly sandy and there is very little soil that would be adapted for farming purposes except some locations in the south and northeasterly portions of the township. There are some patches of poplar, but none of any commercial value. The jackpine timber would make ties for railway purposes but the supply is limited. In the centre of the township there is a large muskeg which breaks up the township very much. At the southwesterly part of the township Shell river comes in. This is a large stream about fifty links wide, used at times for floating logs by the lumbermen. There is plenty of fuel all through, the township being covered with timber, but there are no indications of coal or any other mineral, nor is there any fixed rock in any part of the township. Game is scarce, there being only an occasional deer to be seen. The only meadow for grass is in sections 36 and 25, but only in a limited quantity.—*James Warren, D.L.S., 1907.*

51. This township was reached by a trail cut through township 51, range 3, which connected with the Sturgeon lake trail. There was a good deal of difficulty in getting to this township owing to many wet and soft places. There is a good deal of good land in parts of the township especially in the eastern portion. It would be well adapted for farming purposes, but would require the clearing away of the timber, scrub, &c., as the whole surface is covered with woods, there being no prairie or opening of any kind. There is a good deal of very fine timber in the western portions of the township, chiefly spruce and poplar, which are of commercial value. There are no hay marshes, as where there are any openings it is covered with water. The water is good, there being little or no alkali in it. There is a stream running southeasterly through the northerly portion of the township, which is a nice sized

TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 4—Continued.

stream, but it has no water-powers on it as the current is not strong. It has some hay flats along parts of it. There is plenty of fuel all over the township, there being an abundant supply of timber or wood. There are no indications of coal or any mineral of any kind, nor is there any fixed rock exposed anywhere. There are a few ducks on the ponds or lakes, but not very many. This township would be well adapted for farming purposes. Of course there would have to be a good deal of labour expended before the land would be in a state fit for cultivation. At present the township would be liable to frosts, but I think that would be less if the land were cleared up.--*James Warren, D.L.S., 1907.*

Range 5.

10. This township is reached from Moosejaw by following the Wood mountain trail to township 10, range 1, and then following a trail which runs west along the north boundary of township 10, range 4. The soil is a clay or clay loam and suitable for farming except in sections 3, 4, 5, 6, 7, 8, 9, 18 and 17, which are rolling and have considerable stone on them. These sections are best adapted for grazing. The surface is all prairie with no timber except some small maple all along Wood river creek. The prairie is covered with a heavy growth of grass suitable for hay. Water is very scarce except in the river. The water in the lake in section 16 is alkaline but the water in the lake on section 36 is fresh. At the time of survey (June) the river was from ten to fifteen feet deep and had a strong current, but it became partly dry later in the season. This river is not suitable for water-power as the water does not run all year. There were no summer frosts. There is a little wood along Wood river and coal can be procured at Wood mountain. There are no stone quarries, and no minerals of economic value. Game is not very plentiful but there are a few chickens and ducks along the river and a few antelope in the hilly portion to the southwest of the township.—*Chas. M. Teasdale, D.L.S., 1907.*

11. This township is reached from Moosejaw or Mortlach. The trail from Moosejaw runs north of Johnston lake, and is known as the Fort Walsh trail. The soil is a clay or clay loam, well adapted for farming. The surface is all prairie except a little maple and willow bush along the river. There is no timber. Hay is not plentiful, but there is some on the flats on sections 34, 35 and 26. At the time of survey (August) there was no water in the township except in the river and in a long slough in the valley. The stream is from ten to twenty feet wide and contains fresh water. There is very little current, and, as it is practically dry during the fall and winter, it is not suitable for water-power. There were no frosts during the survey. Some deadwood can be had along the river, but not in large quantities. There are no coal or lignite veins, no stone quarries and no minerals of economic value found in the township. Duck and chickens are quite plentiful along the river and a few antelope are found in the west part of the township.—*Chas. M. Teasdale, D.L.S., 1907.*

12. This township was reached from township 12, range 4, by travelling west. The soil is good and suited for agricultural purposes. The surface is rolling prairie with no timber. Hay is not plentiful, but a limited supply is to be had in the small hay marshes and flats along the two branches of Wood river. Good water is to be had in the little branch, Notukeu creek. The north branch, Wiwa creek, was dry at the time of survey, September. Notukeu creek crosses sections 7, 8, 9, 10 and 3, while Wiwa creek crosses sections 31, 32, 33, 34, 35 and 36. No water-powers occur.

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 5—Continued.

The climate is moderate. A limited amount of firewood is to be found along the river. No stone quarries nor minerals were found. Game consists of antelope and duck.—*J. L. R. Parsons, D.L.S., 1907.*

Range 6.

11. This township was reached from township 6, range 12, by travelling south. The soil is of light quality and is only fair agricultural land. The surface is level and rolling prairie except the three southwest sections, which are hilly. There is no timber. A fine hay marsh occupies the south half of sections 14, 15, 16 and 17, and the north half of sections 8, 9, 10 and 11, affording abundance of good hay. This hay was cut this year by settlers or ranchers. Water is very scarce and at the time of survey (September) it was possible to obtain it only by digging in the centre of hay marshes and dry slough bottoms. No creeks nor water-powers occur. The climate is moderate with light frosts. No fuel, stone quarries nor minerals were found. Antelope was the only game seen.—*J. L. R. Parsons, D.L.S., 1907.*

12. The north half of this township is poor soil, while the south half is fair and suited for agricultural purposes. The surface is rolling prairie with no timber. Hay is not plentiful, but a little is to be found along the banks of Notukeu creek. Good water is to be found in this creek, which crosses sections 18, 17, 16, 15, 9, 10, 11 and 12. It averages twenty-five links wide, two feet deep and has a current of one and one-half miles per hour. No water-powers occur. The climate is moderate with slight frosts. A little fuel is found along the creek. No stone quarries nor minerals were found. Game consists of antelope and duck.—*J. L. R. Parsons, D.L.S., 1907.*

34. This is a rough broken township. South Saskatchewan river enters the township in section 2. It flows northward through wide undulating flats, in a channel with sharp cutbanks twenty to thirty feet above low water. It cuts sections 2, 11, 10, 15, 14, 23, 22, 27, 28 and 33. A large and a small island is formed by two channels of the river in sections 27 and 28. The large island is covered with a heavy growth of poplar, willow, ash and alder scrub. The south channel has the widest and deepest stream. A small wooded island is formed near the left bank on section 2. At the medium height of water a long narrow island is formed along the right bank in section 2 by a narrow stream that branches off the main stream about a quarter of a mile above the south boundary of the township. This stream will be dry in low water. The lower portion of the island is covered with a thick growth of small willow, the remainder with heavy poplar and willow scrub. A long narrow crooked body of fresh water known as Pike lake, covers a portion of sections 9, 4, 5, 8, 17, 16 and 21. It seems to be well stocked with fish principally pike. The west shore through sections 5 and 8 and the east shore through section 8 is well defined with good banks. The remainder of the shore line is low and flat. A small creek runs into the lake on the east side of section 5 and one out of the south and through sections 9, 16, 21, 29 and into the river in the southeast corner of section 32. These creeks are dry during the summer.

Browns lake, a shallow body of fresh water, cuts the corners of section 32 and 33. It is muskeggy on the west and north sides. From section 17 a muskeg and marsh extend across sections 20, 29 and 32. A large quantity of hay can be cut in the marsh on sections 29 and 32. The river valley is skirted on the east by a range of hills sloping to the river and outlined, roughly speaking, by a crooked course from the northeast corner of section 1 through 12, the west half of 13, the southwest corner

TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 6—Continued.

of 24, skirting the river closely through 23 and 26 and into the centre of 27, thence northeasterly through 27 and the west half of 35. The valley is marked on the west side by a range of similar hills, whose outline is near the centre of sections 5, 8, 17, 20, 29 and 32. The hills on both sides of the valley are mostly light sandy soil, third or fourth class and fit only for grazing purposes. The western hills are thickly dotted with poplar bluffs with timber four inches to eight inches in diameter. The eastern hills are nearly bare, having only odd clumps of brush or light poplar bluffs. The greater part of the valley is covered with poplar bluffs and heavy underbrush of willow, poplar, alder, ash, cherry and hazel with intervening prairie openings. A large portion of the poplar is large enough for building purposes, fencing, etc. Only a small portion of the willow is large or straight enough for fence posts. There are some scattered cottonwood trees twelve to twenty inches in diameter along the river in sections 2 and 11. The largest quantity of timber is on the flats in sections 27, 28, 33 and 34. A great quantity of firewood can be taken off these flats. On the west side of the river nearly all the homesteads in the valley are taken, and some settlers have made good improvements. The soil of this part of the valley is mostly a rich clay loam. An Indian reserve in the southeast corner of the township covers the most of the good land on the east side of the river. A trail from Saskatoon to the Indian reserve runs along the east side of sections 25 and 24 and through 13 into the reserve. An old trail on the west side of the river passes nearly due south through sections 32, 29, 20, 17, 8 and 5. Some very strong springs flow out at the foot of the hills in section 32. Indications are that enough water could be got here to supply a large town. No stone quarries or minerals of economic value were found. No water-power exists except what might be developed on the river. Game was scarce. Some badgers, rabbits, coyotes, grouse and prairie chicken were seen, also some marks of deer but none were seen.—*Wm. R. Reilly, D.L.S., 1907.*

35. The surface, soil and general appearance of this township vary very much. The southeast and northeast corners are broken by the south branch of Saskatchewan river. The eastern part is rather flat, being valley land, the western part rolling to hilly. The division is marked by a range of hills skirting the flat from the southeast corner of section 35. An old trail follows the brow of these hills. It is the summer road of the settlers in the valley up the river. They make a winter road in the flats below. Moon lake in the flats is a shallow body of fresh water cutting sections 10, 14, 15, 16, 21, 22 and 23. It has low marshy shores with reeds on the greater part of its border, extending far out into the water. It can be easily drained into the river. A large portion of the southeast quarter of the township and sections 22, 23, 24, 25 and 36 are covered with a heavy growth of red willow, poplar and balm of Gilead. Some of the willow is large enough for fence posts. The poplar and balm of Gilead can be used for fuel and rough buildings. The remainder of the township is dotted more or less with clumps of poplar and willow brush, which will supply fuel and fencing, but very little building material. The soil of the flats is mostly good clay loam. The upland in the northwest quarter of the township is good sand loam. There is light sand in the southwest corner of the township and on sections 1, 2, 3 and 4. This part of the township is of little use for farming purposes but will make good grazing land. The greater number of the homesteads have been taken up, and good progress made in many cases. Hay is not plentiful but a limited quantity can be cut in many places on both low and high ground. The soil, character of the ground and shelter for stock, make the district more suitable for mixed farming than for exclusive grain growing.—*Wm. R. Reilly, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 6—Continued.

48. This township is on the whole very sandy and light soil, timbered with spruce, jackpine, and poplar. Some of the timber is of commercial value, but the greater part is small and light. There is a good deal of scrub especially along the banks of the Snake Plain creek which runs through this township. This stream has a very slow current as is indicated by its crooked course. There are no water-powers on the stream in this township as in the township to the west. There are no indications of fixed rock, nor mineral of any kind, but there is plenty of fuel consisting of the timber now growing. There are no hay marshes or meadows in any part of the township. There are two lakes partly in this township and in the adjoining lands.—*James Warren, D.L.S., 1907.*

Range 7.

11. This township was reached from township 12, range 6, by travelling westward along the north bank of Notukeu creek. The soil is light but of good quality and is suitable for agricultural purposes. The surface is rolling prairie with no timber. Very little hay is to be found in the few scattered hay marshes. Water is very scarce except in Notukeu creek, which crosses sections 31, 32, 33 and 34, and averages twenty-five links wide, two feet deep and has a current of one and one-half miles per hour. No water-powers occur. The climate is moderate with light frosts at the time of survey (September). The only fuel consists of a little brush found along the banks of the creek. No stone quarries nor minerals are found. Antelope and duck were the only game.—*J. L. R. Parsons, D.L.S., 1907.*

12. This township was reached from township 12, range 6, by travelling along the north side of Notukeu creek. The soil is light but of good quality and suited for agricultural purposes. The surface is level and rolling prairie with no timber. A little hay is to be found in a few scattered hay marshes. Water is very scarce except in the creek which crosses section 3, 2, 11, 12 and 13, and averages twenty-five links wide, two feet deep and has a current of one and one half miles per hour. No water-powers occur. The climate is moderate with light frosts at the time of survey (September.) The only fuel is a little brush found along the banks of the creek. No stone quarries nor minerals occur. Game consists of antelope and duck.—*J. L. R. Parsons, D.L.S., 1907.*

48. This township was reached from the trail passing through Mistawasis Indian reserve which is a very good trail for travelling. The township is very much broken up with lakes and small ponds. We traversed eighteen and there are a number nearly large enough to be included in the traverse. The soil is largely clay and would be fit for cultivation, but for the greater part the township is better adapted for ranching as there is an abundance of good feed in the township, but only very few hay marshes. There are no indications of any minerals, but for fuel there is plenty of wood, and in parts there are some good patches of jackpine that would be available for railway ties. There is a fine stream, Snake plain creek, running through the southerly part of the township on which there are many good millsites or water-powers for any kind of machinery. There are few such streams in the territory. From fifty to one hundred horse-power could be easily developed. The water in the lakes and streams is very good being almost entirely free from alkali and in many of the lakes there are plenty of fish. Game is also plentiful in some localities, deer and duck being quite common. On the whole the township would be better adapted for ranching than for any other purpose.—*James Warren, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 7—Continued.

49. This township was reached from the Snake plain trail through the Mistas-wasis Indian reserve. The trail was a very good one and easy to travel on owing to the dry nature of the soil. A great part of the soil in this township is light or sandy, parts of the south and west being somewhat heavier. The soil as a whole is better adapted for grazing or ranching than for farming, as the grass in the woods is very good and there is also plenty of water. The surface of this township is nearly all wood or covered with light scrub. There are a few openings in the north-easterly parts of the township. There is no timber of any commercial value on the township, being chiefly small poplar and scrub. There are no hay marshes or lands, as around the lakes the land is dry. The water is generally good being fresh and not very alkaline anywhere. There are no streams of any size and consequently no water-powers. There is plenty of wood fuel, but there are no indications of coal, of any fixed rock, nor of any kind of mineral. Game is scarce, none of any sort being seen. The soil and surroundings would indicate that the township could be utilized for ranching, there being plenty of pasture in the woods but the scarcity of hay would be a drawback.—*James Warren, D.L.S., 1907.*

Range 8.

11. This township was reached from township 12, range 7. The soil is light but of good quality and is suited for agricultural purposes. The surface is rolling prairie with no timber. Fresh water is found in the Notukeu creek, which crosses sections 18, 19, 20, 29, 28, 27, 26 and 36, and averages thirty links wide, two and one-half feet deep and has a current of one and one-half miles per hour. There are no water-powers. Hay grows in the small hay marshes scattered through the township, a large hay marsh occurring in section 6. The hay is marsh grass of good quality. The climate is moderate with light frosts at the time of survey (September.) Fuel consists of a little brush found along the creek. No stone quarries nor minerals were found. Antelope and ducks were the only game.—*J. L. R. Parsons, D.L.S., 1907.*

12. This township was reached from township 12, range 7. The soil is light and sandy and on account of the hills suited only for grazing. The surface is rolling and hilly prairie with no timber. A little hay is to be found in the few small hay marshes in the township. Water is scarce. A little was found in marshes which had not dried up, but no creeks were found and consequently no water-powers. The climate is moderate with sharp frosts at the time of the survey, (September.) No fuel, stone quarries nor minerals were found. Antelope was the only game.—*J. L. R. Parsons, D.L.S., 1907.*

Range 9.

11. This township was reached from township 12, range 9. The soil is light, with much sand and gravel, and is suited only for grazing purposes. The surface is rolling and hilly prairie with no timber. Marsh grass of good quality is found in a number of small hay marshes throughout the township. Fresh water is found in the small marshes and in the middle branch of Notukeu creek. This creek, which crosses sections 7, 18, 17, 20, 21, 22, 23 and 24, averages thirty links in width, two and one-half feet in depth and has a current of one and one-half miles per hour. No water-powers occur. The climate is moderate, with light frosts at the time of survey—October. Fuel consists of a little brush found in the valley. No stone quarries nor minerals occur. Antelope and duck were the only game.—*J. L. R. Parsons, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 9—Continued.

12. This township was reached from township 12, range 8. The soil is sandy and light, and suited for grazing purposes. The surface is rolling and hilly prairie, with no timber. Marsh grass and red top were found in a few scattered hay marshes. Fresh water was scarce and was found only in a few marshes and in a small lake in section 35. No creeks and no water-powers occur. The climate is moderate, with light frosts at the time of survey—October. No fuel, stone quarries nor minerals were found. Antelope and ducks were the only game.—*J. L. R. Parsons, D.L.S., 1907.*

Range 10.

11. This township was reached from township 12, range 9. The soil is light in quality but is fairly well suited for agricultural purposes. The surface is rolling prairie with no timber. Fresh water was found in the small marshes in the township, in a large marsh in section 22, which drains into Turkeytrack lake, and also in Notukeu creek and its branches. One branch, Mosquito creek, flows southerly through sections 19, 18, 17 and 8, joining the main creek in section 5. This is twenty links wide, one foot deep and has a current of one and one-half miles per hour. Old Notukeu creek flows through sections 5, 4, 9, 10, 11 and 12. It is thirty links wide, one and one-half feet deep and has a current of one and one-half miles per hour. No water-powers occur. The climate is moderate, with light frosts at the time of survey—October. The only fuel is a little scrub found along the creeks. No stone quarries nor minerals occur. Antelope and ducks were the only game.—*J. L. R. Parsons, D.L.S., 1907.*

12. This township was reached from township 12, range 9. The soil is light with much gravel and sand and is suited only for grazing purposes. The surface is rolling and hilly prairie with no timber. Marsh grass of good quality is to be had in the few hay marshes in the township. Fresh water is scarce and is found only in the few small marshes which occur. No creeks nor water-powers occur. The climate is moderate with light frosts at the time of survey—October. No fuel, stone quarries nor minerals were found. Antelope was the only game seen.—*J. L. R. Parsons, D.L.S., 1907.*

Range 11.

47. This township is reached from township 49, range 12, by travelling south to an old trail called the Carlton trail, running southeast to township 47, range 11. This trail is not much travelled in the eastern part, although it is in good condition. Settlers have travelled to this township without any trail from the west for timber, which they cut on section 31. One of my party went to town for supplies by going west across country to Meeting lake postoffice, which is situated on township 47, range 13, and from there following a new trail until he struck the road leading from town to township 49, range 12. The soil is generally a layer of six to twelve inches of sandy loam over a sandy clay subsoil, well adapted for farming, but if hay were more plentiful it would be a good country for ranching, with its numerous valleys and sloughs giving an abundance of water. Gravel and stones are found on every section, but as this is one of the features of the surrounding country the settlers seem to be quite satisfied with their lot. The surface is hilly and in places very broken, in fact, it is one of the most hilly townships which I have surveyed for a few years. Slopes rising to one hundred feet are frequent, but there are very few coulées with sides steep enough to be an obstacle to travel. From an elevation situated on the southwest quarter of section 16 we had a view of the country for ten

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 11—Continued.

miles all round except where the sight was blocked by the hill situated on the north boundary of section 10. The north part of the township, especially the northeast, is covered with poplar of fair proportions. On section 31 there was a fine grove of spruce, now cut for the most part by the settlers. It was one of the few places where spruce was found in this township. In fact, there is not a great amount of commercial timber in this section and it would be safe to preserve the timber on sections 33, 34 and 35 for the use of settlers. Besides a mile and a half in the north containing a certain amount of timber the township is a succession of patches of open prairie, extents of scrubby prairie and areas covered with willow brush and scattered bluffs of poplar from four to eight inches in diameter. The largest space of open prairie is situated partly in sections 28 and 21, encroaching towards the east of sections 22 and 27. But although the remainder of the township is not all prairie the bush can easily be cleared, and there exists actually on every quarter section enough of open land to give plenty of farming land to a new settler. Hay is not plentiful. Although the place is within the reach of settlers none have come this way for hay, they seem to prefer going north. However, around the edges of the numerous sloughs existing here there is a fair quantity of hay in some places sufficient to save a good crop. Water is good all over. There are no water-powers, and fuel is not plentiful, except in the north part. No stone quarries nor minerals exist. Duck and prairie chicken were the only game seen, although quite a few tracks of moose and deer were observed.—*Geo. P. Roy, D.L.S., 1907.*

Range 12.

11. A good trail from Swift Current affords easy and convenient access to this township. The soil is chiefly loam with clay subsoil making good farm land when not too rough for cultivation. The surface is chiefly open prairie, more than half of the township being very rough. There is no timber except in sections 11, 14 and 23 where there are clumps of willow along Russell creek. The only hay obtainable is a light growth on the uplands. Russell creek traverses the township from northwest to southeast. It has a rapid flow of excellent water which seems to be permanent in this township, but soon after leaving it, becomes entirely absorbed in the lower flats beyond. The width of the creek varies from five to thirty links and the depth from six to eighteen inches. The climate is good and summer frosts do not appear to do any damage, but the precipitation of moisture is light. A small quantity of brush along the creek affords a meagre supply of fuel, but there is no other source of supply nearer than Swift Current. There are no stone quarries or minerals of economic value. The only kinds of game seen were a few antelope and duck. This township is well adapted for ranching purposes fully half of it being too rough for cultivation. The only settlers are the Russell brothers who occupy section 23 and have a small ranch.—*Geo. Edwards, D.L.S., 1906.*

12. A good trail from Swift Current affords access to this township. The soil is chiefly sandy loam with hard clay subsoil, and is well adapted for farming. The surface is open prairie, with no timber of any kind. There are no areas of good hay. Water is scarce and can be obtained only by digging wells. The usual rainfall is light, summer frosts are not frequent, while other climatic conditions are favourable. There is no fuel in this locality and coal would have to be obtained from Swift Current. There are no stone quarries and no minerals of economic value. A few antelope were the only game seen. There are no settlers in this township at present.—*Geo. Edwards, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 12—Continued.

49. The route to this township runs west from North Battleford fourteen miles, thence northwest to this township. The first part is an old well-beaten trail extending about twenty-five miles from the town. From there it is merely a track of recent date, made by the settlers, but is in good condition. The soil is sandy loam from six to ten inches deep, suitable for farming. The surface along the north and east boundaries of section 7 is hilly, with a hill about two hundred feet high along the south boundary. The remainder is gently rolling throughout. Except section 6 and a small part of section 7 the township is all bush, mostly heavy bush especially in the northern part. The timber is poplar from eight to fifteen inches in diameter with scattered spruce along the lakes and sloughs, and also some birch. There are a few hay sloughs on the south part of sections 5 and 6 and on section 10, but hay is scarce elsewhere. The water is good wherever found, in the streams and sloughs as well as in two large lakes, Meeting lake on the south and Deserter lake in the northwest corner. These two fine lakes abound with pike. The climate is the same as that of Battleford. We had frost in the beginning of August. Wood the only fuel, is plentiful. Although stones are found on every section there are no quarries nor minerals in the township. There were plenty ducks in Meeting lake, but other game seems to be scarce.—*Geo. P. Roy, D.L.S., 1907.*

Range 13.

10. A good trail from Swift Current affords convenient means of access to this township. The soil is chiefly a heavy stiff clay overlaid in most places with loam from four to twelve inches deep. The surface is open prairie with no timber of any kind. There is some good hay land on sections 1, 2 and 3. A creek enters this township in section 18 and leaves it on the south boundary of section 2. It contains good water and has a rapid current. Its average width is about twenty links and its depth twelve to eighteen inches. A small creek from the north enters it near the southeast corner of section 18. There are no other creeks of any account. The climate is good, although the average rainfall is light. Summer frosts do not seem to prevail. No fuel supply is available nearer than Swift Current. There are no stone quarries nor minerals of economic value. The only kind of game noticed was antelope. There are no settlers here at present. Part of the land is suitable for cultivation, but it is on the whole better adapted for grazing.—*Geo. Edwards, D.L.S., 1906.*

11. A good trail from Swift Current affords means of easy access to this township. The surface is prairie without any timber. There are no hay meadows. A small creek crosses sections 35 and 36. It has good water and a rapid permanent current. In the northern part of the township there are three small creeks with good water but there is little or no flow in dry weather. The average fall of rain or snow appears to be light. Summer frosts are not frequent while other climatic conditions are favourable. Fuel is not obtainable here, the nearest source of supply being Swift Current. There are no stone quarries or minerals of economic value. No game was seen except a few antelope. There are no settlers in the township at present, but it will doubtless be taken up in the near future as about half of it is good for general farming.—*Geo. Edwards, D.L.S., 1906.*

49. This township can be reached either by the trail running northeast nearly direct from Battleford to township 49, range 14 and thence west, or from the road leading to township 49, range 12 which strikes near the southeast corner of this township. Most of the trails are only tracks followed by settlers. The soil is mostly

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 13—Continued.

a layer of eight to ten inches of sandy loam over a sandy clay subsoil, well adapted for farming. The surface of this township is rolling covered in the south part with scattered bunches of poplar, willow brush and scrub with generally a good piece of scrubby or open prairie in every section, which makes the settling of this part very easy. The middle part is more wooded and the northern sections contain heavy timber and thick bush with few openings. Except around the lakes, where there are some spruce, the timber is poplar of very little value except as fuel. There is a certain quantity of hay in the township especially on section 5 but the settlers near by had to go north for most of the hay they required for the winter. There are a large number of sloughs and lakes in this township, the most remarkable being a large and deep lake on sections 28 and 27, and Deserter lake in the northeast corner. Pike are plentiful in these lakes. Water is good wherever found. The climate appears to be good although we had slight frosts in the latter part of July. The available fuel is wood and the supply is plentiful especially in the north part. There are no water-powers in this township, no stone quarries nor minerals of any kind. Game consists of chicken and numerous duck.—*Geo. P. Roy, D.L.S., 1907.*

Range 14.

49. We reached this township by the graded road running due north from North Battleford for a distance of fifteen miles, and thence by following an old trail called the Buffalo lake trail for the remainder of the distance. Mostly all through the soil is a coat of sandy loam six to ten inches deep over a sandy clay subsoil, altogether suitable for farming. The surface is rolling covered with a growth of scrub, willow brush, bluffs of poplar four to ten inches in diameter, and also patches of open and scrubby prairie. There is no spruce nor any kind of commercial timber. The only wood is a small quantity of poplar. The densest wood is found in the northeast corner of the township. There are a few hay sloughs, the largest covering nearly half of section 24. Poplar is the only fuel readily available, but it will not last long after the country is settled. There are no water-powers, stone quarries nor minerals of any kind. Game appears to be scarce. The climate is the same as in Battleford.—*Geo. P. Roy, D.L.S., 1907.*

50. This township can be reached by the trail running northerly from Battleford to township 49, range 14, where it crosses on section 33 what is called the Buffalo lake trail, coming also from this town. This trail enters into the township by crossing the south boundary of section 3 and leaves it on the east boundary of section 13. The soil is mostly a coat of sandy loam, six to ten inches deep over a sandy clay subsoil well adapted for farming. The soil in this township is better than in any of the other townships forming part of my contract. The surface is rolling and covered with a succession of patches of open prairie, scrubby prairie which a good fire would clear, and large spaces containing small poplar, willows and scattered bluffs of poplar. There are no spruce groves, the only wood of the kind being on the shores of the lake situated on the east boundary of sections 25 and 36. It is on these two sections also where the heaviest and densest timber is seen, penetrating from there into sections 26 and 35. There is also quite an amount of fairly large poplar on sections 13 and 24, and large extents covered with it on the other sections, but these extents are intersected with spaces of prairie, scrub, small willows and small poplar. There are hay sloughs on every section, but the largest ones are situated on section 3 and sections 23 and 24. The hay in those sloughs was cut this year by settlers from the south. The water is good everywhere

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 14—Continued.

in the sloughs and the lakes. The climate is the same as in Battleford. The only kind of fuel known is wood and the supply, especially in the south part of the township, cannot last long if not carefully looked after. We saw no stone quarries nor minerals of any kind. Plenty of duck, some prairie chicken, and a couple of scared deer constituted the game that we saw here, but this part of the country has the reputation of being a very good game country.—*Geo. P. Roy, D.L.S., 1907.*

51. The southern part of this township is reached by following the graded road fifteen miles due north from North Battleford and the Buffalo lake trail running northeast to township 49, range 14, through which it runs nearly north until it reaches section 33 where we left it to go into township 50, range 14; across this last township we travelled to township 51, range 14, on a trail of our own. The northern part can be reached by a trail which crosses it diagonally on sections 30, 31 and 32. I was informed that this trail comes from Jackfish lake but I could not ascertain where it leads after leaving township 52, range 14, along the east outline of which it runs for three miles. It is in good order. The surface is rolling covered in the southwestern part with patches of light scrub, willow brush and scattered bluffs of small poplar. Brush and bush thickened gradually going northeast until on sections 35, 36, 24 and 25 we met a dense wood of poplar, spruce and jackpine six to eighteen inches in diameter. There is, however, no extent of commercial timber of any consequence, poplar being nearly the only kind all over. However, near the centre of section 24 we saw two groves of fine spruce ten to twenty inches in diameter, each about three or four acres in area. The soil is a coat of sandy or black loam six to twelve inches deep over a sandy clay subsoil; gravel being found in some parts. Although the soil is light it is well suited for farming. Hay is found along the edges of the large sloughs and in some of the smaller ones, but there is no great quantity of slough hay. Water is good all over the township in the sloughs and the lakes. There are no streams and consequently no water-falls. The only fuel available is poplar and there is sufficient of it for many years to come. There are no stone quarries nor minerals of any kind. We saw no game during the survey, except a few duck. The climate is the same as that of Battleford.—*Geo. P. Roy, D.L.S., 1907.*

52. We reached this township by opening a trail of our own which leads from the Buffalo lake trail in township 49, range 14, through townships 50 and 51, range 14, to the wagon trail crossing the south sections of this township. I was informed that this wagon trail came from North Battleford through the Jackfish Lake settlement. It enters township 51, range 14, on section 30, leaving it in section 32, then runs nearly west across sections 5, 4, 3 and 2, northeast across section 1 and part of 12, then along the outline in and out of the township until it leaves it on section 24. I followed it to the base line, which it crosses in a northeasterly direction on the south boundary of the east half of section 32. It is a good wagon trail. The soil is a coat of sandy or black loam over a clay or sandy clay subsoil and the surface is rolling. Along the east boundary of section 36 the country is covered with a thick growth of poplar eight to ten inches in diameter to a coulée about fifty feet deep at the northeast corner of section 25. Along the east boundary of sections 25 and part of 24 there is a thick growth of two-inch poplar and small brush followed by poplar six to ten inches in diameter. From the stream crossing on section 24 to the end of this meridian, the bush is thick poplar with some jackpine and spruce. It grows in size until on the east boundary of section 1, we found spruce from ten to eighteen inches in diameter, and poplar eight to fifteen inches in diameter. We found no hay sloughs along this line. The water is good in the small streams which crosses the line. There were no

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 14—Continued.

water-powers in this township. Wood is the only fuel available. There is a quantity of it all over the township. We saw no stone quarries, nor minerals of any kind. Game was scarce. This climate is the same as that of Battleford.—*Geo. P. Roy, D.L.S., 1907.*

Range 15.

49. This township is reached without any difficulty from the Battleford-Birch Lake trail which passes through township 49, range 16, being from one-half to three miles west of the line between the ranges. The trail is a good one and, although there are two creeks to be crossed, makes the township easily accessible. The soil throughout the township is more or less uniform, consisting of two to three inches of black loam over a subsoil varying from sandy clay to clay, with gravel in some places. Stones and boulders occur to a small extent. Except the southwestern corner of the township the surface is hilly, being much broken by coulées. The northern and western portions of the township are covered with scrub poplar and willow and the western portion with clumps of poplar varying in diameter from four to eight inches. The southeastern portion is more open, although more or less scrub occurs. While no large hay sloughs occur hay could be cut from around nearly all the small lakes or ponds throughout the township. Grass is abundant and of good quality. Several ponds, marshes and small lakes occur in the northern and central portions of the township. Losthorse creek rises in section 25 and flows generally southwest leaving the township in section 4. This with the exception of a small creek in section 5 constitutes the only outlet. Losthorse creek varies from ten to twenty-five feet in width, and from two to four feet in depth with a current averaging about two and a half miles per hour. The water throughout the township is excellent and the supply is permanent. No water-power is available. Besides some marshes adjacent to the creek no land would be flooded. General climatic conditions were favourable, but frosts occur early in the year. Fuel, consisting of poplar, is abundant. No coal or lignite veins economically valuable, minerals or stone in place were discovered. Sand-hill crane, duck of various kinds and prairie chicken were common. Indications of moose and deer were noticed although no large game was seen.—*H. S. Holcroft, D.L.S., 1907.*

50. The old Carlton-Regina trail crosses the northeastern portion of this township entering section 24 and leaving near the northeast corner of section 34. This trail joins the Battleford-Birch lake trail in township 51, range 16. From Battleford the township is easily reached by the trail to Birch lake which passes within half a mile of the southwest corner and enters section 31 near the northwest corner of the township. Both of these trails are in good condition and make the township easily accessible. The soil is rather uniform, varying from two to eight inches of black or sandy loam with a subsoil varying from clay to sandy clay. Stones and gravel occur slightly, but are by no means troublesome. The surface is generally gently rolling, but the northeast corner is rather heavy. The surface is covered with scrub poplar, and willow throughout, while all but the southeast portion is covered with a more or less heavy growth of poplar, ranging from five to twelve inches and averaging about six inches in diameter. Several hay sloughs occur, notably in sections 34, 27, 29, 20 and 17. Grass is abundant. Excellent water occurs throughout the township. Several small lakes and streams making the supply permanent. Outside of the sloughs and marshes mentioned no land is liable to flooding. No water-powers exist. Stone in the shape of boulders suitable for building purposes, occurs to a small extent, but

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 15—Continued.

no stone in place or minerals of economic value were discovered. Fuel is abundant, consisting of dry poplar. The general climatic indications were favourable but summer frosts are more or less frequent. Tracks of moose and deer were common, although no animals were actually seen. Duck, a few geese, sand-hill cranes and some few chicken were noticed.—*H. S. Holcroft, D.L.S., 1907.*

51. The trail from Battleford to Birch lake enters this township through sections 6, 7, 17 and 20. In section 20 it branches, one branch going westerly around Birch lake, and the other going easterly, passing through sections 21, 22, 23, 24 and 25. These trails are moderately good and make the township easily accessible. By trail the south end of this township is about fifty miles northerly from the town of North Battleford. The soil is a light covering of black loam from about two to six inches deep on a top soil of sandy loam or clay loam with usually a subsoil of clay or clay loam. This soil should produce excellent crops of the usual products of the soil in this province. Practically the whole of the surface is covered with a growth of varying density of scrub poplar and willow. Sections 1 to 12, inclusive, and sections 17, 18, 19 and 30 are more lightly covered than the remainder of the township. Bluffs of poplar and balm of Gilead from three to ten inches in diameter occur frequently in the above mentioned sections. The whole of the northeastern portion is densely covered with scrub, moderate sized poplar and balm of Gilead. Some small open spaces occur in sections 1, 2, 3, 10, 11 and 12. An occasional small spruce was seen in the eastern part of the township. The surface is nearly level in the western portion, rolling in the middle and somewhat hilly in the eastern portion. A small amount of hay could be cut around some sloughs in the southwestern portion of the township. The rest of the township contains very little hay except very small amounts around the edges of very small sloughs scattered throughout the township. A large hay meadow occurs on the boundary between sections 12 and 13. Birch lake occupies a great portion of the northern part of the township. This lake presents a very rough outline, having several large points extending out into the lake and several deep bays extending into the land. In sections 30, 29 and 20 the shores are not well defined, being marshy. Several small lakes and sloughs occur throughout the township. Broughton lake in sections 13, 14 and 24 is a long and very narrow lake lying between high banks. Though very narrow, averaging only about one-eighth of a mile in width, it is very deep and contains a large quantity of fish. Birch lake is very plentifully stocked with pike and pickerel, and I believe whitefish also. All the water is fresh and is sufficient and permanent. No power could be generated from falls or rapids. A heavy frost occurred on the 12th of August, but apparently did no harm. This season was very wet and somewhat cold, but the climatic conditions seemed in general to be favourable. Fuel, in the shape of poplar and balm of Gilead, is plentiful throughout all the township. No coal or lignite veins were seen. Boulders and stones occur in small numbers on the surface. Throughout the township no stone in place or any economically valuable minerals were encountered. Game is rather scarce, a few duck and an occasional prairie chicken were seen, also some traces of deer, bear and muskrat. Badger, coyotes and gophers were scarce.—*H. S. Holcroft, D.L.S., 1907.*

52. The western portion of this township is reached without any considerable difficulty by the trail from Battleford to Birch lake, a branch of which passes round the west of Birch lake, entering the township in section 7. Another branch of the same trail enters the township in section 18. In wet weather both these trails are very difficult to travel, as the first follows the west and north shores of Birch lake, while the other passes in close proximity to the southern shore of Long lake, the

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 15—Continued.

shores of both lakes in these places being marshy. The soil throughout the township is very uniform and in most places of first class quality, consisting of from two to ten inches of black or sandy loam with a subsoil varying from sandy clay to clay. Pebbles and stones occur but seldom, and never in such quantities as to hinder agricultural operations. The surface is gently rolling, there being two general slopes, one towards the northwest drains into Long lake, while the other, comprising practically all the township, drains into Birch lake. Spruce is found scattered all over the township and around Birch lake. While much of the larger timber, especially that adjacent to Birch lake has been cut, there still remains a considerable quantity of good timber, averaging about twelve inches in diameter, although some trees thirty inches in diameter were noticed. A few tamarack occur in the northeastern portion of the township. Poplar and balm of Gilead occur uniformly throughout the township, having a maximum diameter of about fifteen inches and averaging about eight inches. Jackpine in small quantities occur on nearly all the ridges in the central and northern part of the township, having a maximum diameter of twenty-two inches, but averaging about ten inches. Some poplar and willow occur all over the township. The marshes along the north shore of Birch lake and all around the shores of Long lake would supply an immense quantity of fine hay, especially sections 17 and 20, although in a wet season much of this would be difficult to cut. A few meadows scattered throughout the township would slightly augment the supply of hay. The water throughout the township is excellent, due, no doubt, to the fact that the moss and marshes form excellent reservoirs, keeping the creeks full of pure cold water. Several of these flow south into Birch lake. This lake occupies practically all of the southern two tiers of sections and extends also into township 52, range 16. The water is good. The shore presents a very broken appearance and is generally ill-defined, being marshy for the most part and often separated from a lagoon or marsh by a thin fringe of boulders. Long lake, which occupies practically all of sections 19, 30, 31 and parts of sections 29 and 32, is a fine sheet of clear, cold water, extending far to the north. A small lake occurs on the east outline in sections 24 and 25. A few small lakes and sloughs scattered throughout the township still further increase the water supply. No water-powers occur. Although the summer of 1907 was extraordinarily wet the general climatic indications were favourable, the nights being cool and the days moderately warm. Frosts occurred on August 1st and 2nd, but apparently no harm resulted. Fuel is plentiful throughout the township. No coal, lignite or minerals of economic importance were discovered. Stone suitable for building purposes in the shape of boulders and irregular pieces of rock occur in several places on the shores of Birch lake, but no stone in place exists. Game, while not abundant, is frequently found. A moose cow and calf were seen on Birch lake. Several varieties of duck, a few ruffed grouse, some pelican, sand-hill crane and muskrat were noticed. Traces of deer and bear were observed. Both Long and Birch lakes contain an immense quantity of fish including pike, pickerel, sucker and whitefish.—*H. S. Holcroft, D.L.S., 1907.*

Range 16.

8. The route to reach this township is by trail from Swift Current. This trail runs south to township 10, range 14, from which point we went in a southwesterly direction to the northeast corner of the township. It is a good hard road most of the way. The soil is for the most part about six inches of clay loam with a clay subsoil and is suitable for grazing being covered with good grass. The whole township is prairie with a little scrub along a small creek in section 35. The surface is mostly

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 16—Continued.

rolling but in some places quite hilly. The water is good and many springs appear in the hills but none large enough to be utilized for water-power. The climate is good. There is scattered stone suitable for building but no indication of other minerals of economic value. The wild animals found were antelope, coyote, badger and gopher.—*J. Waldron, D.L.S., 1907.*

52. The township is reached without difficulty by means of the Battleford-Birch Lake trail, which enters the township from the southeast in section 2. The soil consists of from three to seven inches of black loam with a subsoil varying from sandy clay to sandy loam. Stones and small boulders occur in several parts, but are not of sufficient size or quantity to hinder agricultural operations. The southern part of the township is covered with clumps of poplar and willow scrub but towards Birch lake, which lies in the southeastern part of the township, these become more dense and much heavier. To the east and north of Midnight lake which occupies a large portion of the western part of the township some spruce and a few tamarack occur. Although much of this has already been cut there are perhaps fifty or sixty thousand feet of lumber still standing, the trees considered averaging eight inches in diameter. Between Midnight lake and Long lake, which occupies the northeast corner of the township, the country is gently rolling and covered with poplar and balsam of Gilead averaging six inches in diameter, and dense scrub and underbrush. Thus, except the southern part, the township is heavily wooded and fuel, consequently, abundant. Excellent hay meadows occur in the south and, in fact, grass is everywhere abundant. A large hay slough occurs to the west of long lake. The southwestern part of the township is level the remainder being gently rolling. Three large lakes enter the township on the west. Midnight lake occupies nearly all of sections 7, 18, 19, 30, 17, 20, 29, 28, 21 and 22. The water while slightly brackish is not at all bad. Several streams enter the lake, the largest, formed by the union of creeks from Birch and Long lakes, is about ten feet wide, and from two to four feet deep with a current of two miles per hour. Long lake lies in the northeast occupying sections 36, 25 and 24. The water is clear and the shores sandy. Birch lake, although a very large body of water, occupies only sections 1 and 12 of this township. The water is good although not so clear as that of Long lake, the shores being more marshy. No water-power exists. The days are warm and the nights are cool but so far (July) no summer frosts have occurred. No coal or lignite is known to occur, nor was any stone in place found. While deer, bear and moose undoubtedly exist, the only game seen consisted of duck which were exceedingly abundant. The lakes, especially Birch and Long lakes, contain an abundance of fish. The two southern tiers of sections are reserved for Indian lands and are exceedingly well adapted for ranching or for farming. Several itinerant bands of Indians of a rather fine type were met with around the lakes. One rancher has done considerable work to the south of Midnight lake and reports it as an ideal ranching district, the stock finding ample shelter amongst the dense clumps of scrub, and hay being everywhere abundant.—*H. S. Holcroft, D.L.S., 1907.*

Range 17.

8. The route to reach this township is by trail from Swift Current to township 10, range 14. From here we travelled in a southwesterly direction to township 8, range 16, and then west to range 17. The soil varies from a sandy to a clay loam of about six inches with a gravelly or clay subsoil. The whole surface is rolling, open, prairie, no timber of any kind being found, and is very suitable for grazing. A few sections in the northern part of the township are suitable for farming. There are no

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 17—Continued.

large hay meadows but good hay could be cut on the high ground. There is plenty of fresh water in small sloughs and in springs that rise in the southeast and northwest parts of the township. There are no water-powers. The climate is good, only a few frosts occurring even in the early part of October. The nearest fuel is about twenty miles west in the Cypress hills. There is some surface stone, but no minerals appear. Antelope, coyote, badger and gopher are plentiful.—*J. Waldron, D.L.S., 1907.*

Range 18.

8. This township is most easily reached by a trail running south from Gull lake to some settlers' homes in township 9, range 19. From here it is good travelling across the open prairie into township 8, range 18. This trail is good at all seasons of the year. The soil is mostly eight inches of light loam with a clay subsoil, and is suitable for farming or grazing purposes. The eastern part of the township is quite rolling while the western part is quite smooth and is very good farming land. Grass is abundant everywhere. There is no timber and the nearest fuel is in the west side of township 8, range 20. Water is not very plentiful on the surface in autumn but where obtained it is fresh. No water-powers occur. The climate is good. Some stone can be had in the southern part of the township but there are no indications of minerals. Antelope, badger, coyote and gopher are plentiful.—*J. Waldron, D.L.S., 1907.*

Range 19.

8. This township is best reached by a trail from Swift Current which enters the township at the northwest corner. It is hard and passable at all seasons of the year. The soil is mostly a sandy loam with a clay subsoil, and is suitable for agricultural purposes. The surface is mostly level except in the south where it becomes more broken. No wood is found in the township but it is to be had in the west side of range 20 of the same township. There is also a little wood in a coulée south of this township. Hay can be had anywhere in the township and in large quantities in the central part. Fresh water is plentiful in Rock creek which passes through the township from one to two miles from the east boundary. Sloughs are not plentiful but there are two lakes with water only slightly alkaline. No water-power is available. The climate is good. In the south there are a few scattered stones and some indications of soft coal which is plentiful, and has been mined in the township to the south. No other minerals of economic value appear. Game is not plentiful although some antelope were seen. Coyote, gopher and badger are numerous.—*J. Waldron, D.L.S., 1907.*

Range 20.

8. This township is reached by a trail from Gull lake which enters the northeast corner of the township. The soil varies from sandy loam to clay and gumbo with clay subsoil. The surface is fairly level in the eastern and southeastern parts of the township. The central and southern part is broken by Swiftcurrent creek. On the west side are the Cypress hills, at the foot of which is Jones creek, a branch of Swiftcurrent creek. Between the creeks is a level bench of good prairie. The level part of the township is suitable for farming while the sections through which the creeks pass is especially suitable for ranching. Hay can be had in quite large quantities on the level sections. Fresh water is plentiful in the creeks, and several springs occur in hills along the creeks. The flats along the creeks could be made quite fertile by irrigation and some work has been done along that line by some of the settlers.

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 20—Continued.

There are no water-powers available: Wood is found only on the western side of the township in the coulées, and some indications of coal appear in the Cypress hills in section 18. The timber is principally poplar and willow with some spruce and is very suitable for fuel and building purposes. Scattered stone is present in the broken parts, but no minerals besides coal appear. The only animals seen were coyote, badger, gopher and a few prairie chicken.—*J. Waldron, D.L.S., 1907.*

Range 21.

8. This township is best reached by a surveyed trail from Maple creek which enters the township on the west side in section 18. The soil is mostly clay loam with a clay subsoil. The surface is rolling in the west while the central and eastern part is hilly. The township is open prairie except the coulées on the eastern side. These are generally wooded with poplar and willow, while a few good spruce occur. The timber is suitable for fuel or building purposes. The whole township has abundance of grass and is especially well suited for grazing. Fresh water is to be found in several small lakes and in the coulées on the eastern side. Swiftcurrent creek rises in section 10 and flows south nearly parallel to the east side of sections 10 and 8. No waterfalls occur but the creek has sufficient fall to be used for irrigation purposes with good results. The climate seemed good but suggests the possibility of early frosts because of its high altitude. Scattered stone is plentiful. A very soft coal appears in section 13 but seems charred. No other minerals appear. Prairie chicken, coyote and badger were the only animals seen.—*J. Waldron, D.L.S., 1907.*

Range 27.

51. The surface of the township is from rolling to hilly. It is dotted all over with bluffs of poplar, many sloughs and patches of marsh. Four large lakes occur in the following sections, one in 14, one in 26 and 27, one in 31, and one in 32. The lakes in sections 14 and in 26 and 27 are much smaller than they were at the time of the original survey. These lakes have no outlet and rise and fall in wet and dry season the same as sloughs. The lakes in sections 31 and 32 have not changed much. They have an outlet are fed by springs and do not vary much in height. Big Gully, a permanent spring creek, flows out of the lake in section 32 through sections 32, 28, 30, 20, 17, 16, 9, 3 and 2. From section 29 it runs into 30 is there joined by a branch from the west and passes through a marsh from 30 to 29. From section 29 it runs through a valley from three-quarters to half a mile wide, formed by banks from one hundred to one hundred and fifty feet high. The stream passes through several stretches of muskeg, where it has no channel. The water in most of the sloughs is good, in the lakes in sections 31 and 32 and in the creek it is excellent. A limited quantity of building logs, fencing and fuel is found on every section. The soil is mostly a good sand loam with odd patches of clay loam on sandy and clay subsoils. It is generally second class. The southwest corner is the best part of the township. Hay is not very plentiful but a considerable quantity can be cut around sloughs and in the valley of the creek. The trail from Lloydminster to Hewitt landing and Onion lake runs through sections 6, 7, 8, 17, 20, 21, 28 and 33. The creek is bridged where the trail crosses. A number of settlers have homesteaded and are making good progress. Northminster postoffice is on the northeast quarter of section 18. No stone is found other than scattered field stones around several sloughs and lakes and along the creek. There is no water-power that would be permanent. No minerals of economic value are found. Game is limited to badger, coyote, skunks, muskrat, prairie chicken, duck and geese, none of which were plentiful. The weather during the sur-

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TOWNSHIPS WEST OF THE THIRD MERIDIAN.

Range 27—Continued.

vey (October) was exceptionally fine. General appearances indicate a section of country that is supplied with a good deal of rain. Vegetation is excellent and water is good while the soil is rich and fuel plentiful. These conditions make it well adapted for mixed farming where stock raising would be the principal object. Horses, cattle, or hogs would do well, and if properly cared for the chances of failure with either would be slight.—*Wm. R. Reilly, D.L.S., 1907.*

52. The surface is rolling to hilly, most hill slopes being gradual and capable of tillage. There are many lakes and sloughs, the majority in the south half of the township. The water in all these water areas is fresh and much lower than at the time of the original survey. The lakes on the north boundary of section 9 and in the northeast quarter of section 8 have dried up very much. The lakes in sections 5 and 6 are fed by springs and have not changed much, the water in these is extra good. Small poplar bluffs and clumps of willow are dotted all over the township, the poplar is small but affords a limited supply of fencing and firewood. On sections 6 and 7, south of the lake in 15, and south of the lake in 12, are belts of poplar with timber large enough for log buildings. The soil is mostly of fair quality being sand and clay loams on clay and sand subsoils. Hay of good quality can be cut around nearly all sloughs and lakes but no great quantity in any one place. This is not a grain district but it is well adapted for dairying, cattle and other stock raising in connection with general farming. A number of settlers have recently taken up homesteads and are making improvements. A trail from Lloydminster to Hewitt landing and Onion lake runs northeasterly through the township from section 4 to section 36. There is very little stone, no minerals of economic value, and no water-powers. Game is scarce, and is limited to badger, coyote, skunks, muskrat, gopher, prairie chicken, duck and geese. The weather during the survey was extra fine for the season of the year. Grain crops in this district were damaged by frost owing to the backward spring and late sowing.—*Wm. R. Reilly, D.L.S., 1907.*

53. Saskatchewan river enters this township in the north half of section 24 and leaves it in the north half of section 1 crossing the township in almost a straight line. Two large wooded islands are formed in the river one in sections 19 and 20 about three-quarters of a mile long, and one on sections 20 and 17 about half a mile long. The south bank of the river is very rough. A mile from the west boundary it extends back a mile in broken steeps rising to a height of over four hundred feet. It gradually falls towards the east to about two hundred feet above the river in section 1. The north bank is not so rough, it extends back about half a mile, rising to an average height of about two hundred feet. South of the river is very rolling or hilly. A number of lakes and sloughs are scattered over this part but are apparently much smaller than at the time of original survey. Bluffs and stretches of willow and poplar of small growth are thinly scattered over the upland and down the river bank. North of the river is a rolling bluff country, which gradually rises to the north. The most of the northeast quarter of the township is nearly covered with scrub poplar, odd clumps of spruce six to fifteen inches in diameter, small patches of tamarack six to ten inches in diameter and heavy willow, poplar, alder and other underbrush. Alternate bluffs of poplar, patches of willow and poplar scrub, and large prairie openings occur on the remainder of the tract north of the river. Over this whole area a number of sloughs and lakes are scattered. Large lakes cover a portion of the following sections west half sections 14, 35 and 36, northeast quarter 33, northwest quarters 31, 21 and 22. Water in this lake is strongly alkaline. Water in the majority of sloughs and lakes is good. The soil is mostly sandy loam of fair quality but the northeast corner of the township is very light. A considerable quantity of hay can

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 14—Continued.

of this township, and also in the township just north of it. Probably this township also contains coal. Wood for fuel is very scarce and the nearest obtainable in any quantity is from the Handhills thirty to thirty-five miles south. There is no stone or mineral. Antelope in small numbers is the only kind of game.—*R. H. Cautley, D.L.S., 1907.*

67. The township is reached by the road which follows the south side of Lac la Biche. This road passes through sections 14 and 15. The soil consists of a layer of black loam averaging from five to six inches with a subsoil of clay, sandy clay and in a few cases sandy clay with stones. The soil generally is second class and is fairly good for agriculture. The township is timbered, with a few small open spots in the western part. The timber consists mostly of poplar with patches of fairly large spruce and tamarack. These patches are pretty well scattered throughout the township. Spruce is not found in great quantities. Slough hay can be cut on the west side of Little Egg lake in several places, and some prairie hay in the southwest corner of the township. The water of Little Egg lake is good, but that of the other lakes is likely not fit to drink. The only stream of any importance is the outlet of Little Egg lake. The only water-power that could be obtained would be by damming the outlet of Little Egg lake, which might furnish some power in wet summers. The climate is somewhat colder than that of Edmonton. The most readily available fuel is dry wood. There are no stone quarries nor minerals in this township. There is but little game, as the township is near Lac la Biche settlement.—*Raoul Rinfret, D.L.S., 1906.*

68. There is no wagon road reaching the township, but there is one to township 68, range 13. The township can also be reached by crossing Lac la Biche from its south shore, where there is a wagon road. The soil consists of a layer of black loam, averaging six inches, with a subsoil of sand in the eastern part of the township and of clay or sandy clay in the western part. The western half of the township is good for farming. The eastern half consists of a layer of black loam four inches thick with a subsoil of sand, and would not be good for farming. The township is well timbered throughout. There is a large quantity of spruce and jackpine in the northern part of the township, with bunches of fine spruce of small extent. In the southern part of the township there are bunches of poplar and poplar mixed with spruce. Slough hay can be cut on the shore of Lac la Biche, but only in small quantities. The water in Lac la Biche is very good. There are no streams of importance in the township and consequently no water-powers. The climate is somewhat colder than that of Edmonton. The most readily available fuel is dry wood. There are no stone quarries nor minerals. Lynx, fox and coyote are common. Caribou and moose are likely to be found in the township.—*Raoul Rinfret, D.L.S., 1906.*

Range 15.

29. The route to this township is by trail from Stettler or Gleichen. The trail from Stettler is not so hilly as the other, but both are in good condition. Clay soil, in varying forms of consistency is found throughout. The surface is prairie without any timber. Two-thirds of the township is very hilly, while the balance is rolling. Handhills lake covers a considerable part of sections 6, 7, 18 and 19. This lake is in places over fifteen feet deep and was at one time much larger than at present, the level having fallen fully twenty feet. It has now no outlet, and only some very small creeks flowing into it. The water is very soapy, probably due to the presence of soda. There are no hay areas of any large extent. The nearest present available fuel supply is about ten miles distant, but it is quite likely coal will be found in this township.

TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 15—Continued.

Some was found in the pits on the north boundary of section 31. There are no stone quarries or minerals of economic value. Duck, geese and prairie chicken were seen in considerable numbers. The soil produces excellent grass, and there are springs and sloughs where good water is to be had, making this a good location for ranching, but the surface is too rough for agricultural purposes.—*Geo. Edwards, D.L.S., 1907.*

30. This township is accessible by trail from Stettler or Gleichen, the distance either way being about the same, and the trails being in good condition. The soil is chiefly clay, producing good grass and suitable for ranching purposes. The surface is prairie without any timber. There is some rolling land in the northeast quarter of the township, but fully two-thirds of the area is very hilly. There are no hay sections of any considerable extent. Water is to be found only in a few sloughs. There are no streams. The climate is good. There does not appear to be any special danger from summer frosts. There is no apparent fuel supply in the township. Coal is obtainable in the next adjoining township south. There are no stone quarries or minerals of economic value. No game was to be seen. The township is suitable for ranching, but too rough for agricultural purposes.—*Geo. Edwards, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Hunts' ranch in section 17, township 34, range 15, some three miles across prairie from the north boundary of this township. The soil consists of three to four inches of sandy loam over a hard sandy clay or clay subsoil, and should be described as third class, it is suited only for ranching purposes, as the surface is steeply rolling prairie. There is no timber of any description but a few small hay meadows scattered all through the township. Water is very scarce; a few small fresh water ponds which are liable to dry up in summer are to be found and there are two small springs in the west part of the township. No water-power can be developed. The climate is similar to that in the Stettler district and summer frosts are rare. Coal for fuel can be obtained in the adjoining townships north and east. Wood for fuel is very scarce, the nearest obtainable in any quantity being from the Hand hills, which are about thirty miles south. There is no stone or mineral. Antelope in small numbers is the only kind of game.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Hunts' ranch in section 17 of this township, a distance of fifty-five miles roughly. The soil consists of three to six inches of sandy loam over a hard sandy clay or clay subsoil, and should be described as second class in the north part of the township and between second and third class in the south four miles, where it is very rolling. This would make a good ranching locality and the north part is suitable for mixed farming. The north part of the township is undulating and the south four miles is rolling or steeply rolling prairie. There is no timber of any description. Small hay meadows are scattered all through the township. Sullivan lake, which extends the whole length of this township, on the east sides, is very shallow in most places, the water is slightly alkaline and very muddy, a great quantity of fine whitish clay being held in suspension. There is another permanent lake called Hunt lake in sections 22 and 27, which is also alkaline and muddy. Fresh water is rather scarce though there are a few ponds and a large fresh water spring in section 17, which forms a small creek which flows into Hunt lake. No water-power can be developed. The climate is similar to that in Stettler district and summer frosts are rare. Coal for fuel can be obtained in the northeast quarter of section 34 of this township where there is a one foot seam of

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 15—Continued.

good lignite coal overlaid by two feet of soft brown lignite. Wood for fuel is very scarce, a small amount of dry willow can be obtained around sloughs and ponds. There is no stone or mineral. Antelope in small numbers is the only kind of game.—*R. H. Cautley, D.L.S., 1907.*

66. There is a road from section 33 connecting with the road going through the settlement of Lac la Biche. The soil is fairly good for agriculture, half the sections being first class soil and the greater part of the rest second class. Nearly one-half of the township is covered by lakes, while the remainder is wooded. Spruce is met with in great quantities in the southern and southwestern parts of the township. There are many places where very big spruce are seen. Fine spruce are also found in the north-east corner of the township. The rest of the timber is mostly poplar. Spots of small poplar and willows are not uncommon. The southern part of the township is well timbered with fine spruce. Slough hay can be cut in certain bays of Big Egg lake and south of lake Tremblay. The hay is principally along the northwest end of Big Egg lake. The water of the big lakes is good. There is no stream of importance, except the outlets of Tawakwato and Long lakes. The only water-power which could be developed would be on the outlets of the two last named lakes, by damming up the lakes, although there is very little difference of level, apparently, between Tawakwato and Big Egg lakes. The climate is somewhat colder than that of Edmonton. The most readily available fuel is dry wood, as there is no coal found in the township. There are no stone quarries, nor minerals known. Moose was very plentiful in the south and southwest parts of the township. Fresh tracks and poplar with the bark partly eaten were numerous. The only other game was lynx and foxes.—*Raoul Rinfret, D.L.S., 1906.*

67. This township is reached by roads coming from Lac la Biche settlement. The soil consists of a layer of black loam averaging seven inches on a subsoil of clay or sandy clay, and in a few cases of sand and stones. The soil of the quarter sections is mostly first or second class and is suitable for agricultural purposes. The township is timbered in the southern part while there are open patches in the northern part. The timber is mostly poplar and willow. Spruce is found only in small patches throughout the township. In many places there is only small poplar. In many open spots several hundred tons of prairie and slough hay is cut every year. The water in the lakes of this township is not fit to drink, except that in Big Egg lake. There are no streams of any consequence nor is there any water-power. The climate is colder than that of Edmonton. Wood is the most readily available fuel, as there is no coal found in the township. There are no stone quarries nor minerals, but lynx and foxes are common, while good fish is abundant in Lac la Biche.—*Raoul Rinfret, D.L.S., 1906.*

68. The route by which to reach this township is along the road which follows the south side of Lac la Biche and crosses section 7. The whole township consists of about three sections. The soil belongs to classes one and two, being fairly good for agriculture. The surface is timbered, with spruce in section 31 and poplar in the other sections. Some slough hay might be obtained in section 31.—*Raoul Rinfret, D.L.S., 1906.*

Range 16.

69. The route to the township is by trail from Stettler or Gleichen. The distance is about the same either way. The trails are in good condition. The soil is chiefly clay loam with gravel or clay subsoil, and it is well adapted for general farming.

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 7—Continued.

28. This township may be reached by following a good graded road south from Lloydminster along the fourth meridian about thirty-two miles, crossing Battle river about thirty miles south of Lloydminster, thence by a fairly good trail to the east side of Sounding lake where there is a small detachment of mounted police, thence along the valley of Sounding creek about fifteen miles, thence leaving the valley and over rolling prairie to this township. The soil of this township is generally clay without any black soil on top and may be ranked as third class. The surface is rolling prairie without any timber or scrub. The nearest fuel that I know of is in the valley of a branch of Sounding creek coming in from the west about twenty-five miles distant. There is very little hay land in the township. I found no water, and was obliged to draw it from the south side of township 27, range 7, for my horses and camp use. There are no minerals or stone quarries. The only game seen was antelope.—*David Beatty, D.L.S., 1907.*

Range 8.

1 and 2. The best route for reaching this locality is by way of the police trail from Coutts, a station on the railway owned by the Alberta Railway and Irrigation company, in township 1, range 15. This trail leads directly to these townships and at the time of my visit (August) was in good condition. The soil on the uplands is generally a hard clay with a few patches that appear to be loamy, while in the valleys it is a clay or sandy loam very fertile but limited in quantity. The surface is very much broken by Milk river valley and by coulées leading into it, thus rendering travelling through these townships a rather difficult task. The only timber is in the valleys and coulées, and consists of willow and cottonwood of no great quantity or value. Hay was cut last summer in townships 1, ranges 8 and 9, in a number of places that had been fenced to keep stock away, but it was very short, averaging from six to eight inches. The only water of consequence is Milk river. It is fresh, but during the summer months becomes very low, and I am informed has at times ceased to run entirely. The bottom lands in the valley are liable to be flooded the extent and depth of the flooding depending entirely upon the season. There are no water-powers in this township. The climate is said to be equable with occasional summer frosts, but frequent and violent winds prevail through the entire locality. Both coal and wood are used for fuel in this township. They may be procured along the river and in several of the large coulées. Coal was dug by our party in section 36, township 1, range 9, and I was informed that in section 34 or 35, township 1, range 8, a vein had been opened by the settlers. Veins of weathered lignite were observed in several of the coulées in these townships, which would seem to indicate a very large supply of coal in this locality. There is an abundance of sandstone in the coulées. The harder varieties, which are easily obtained, make very good building material. No minerals of economic value were found by us in these townships. Coyotes, badgers, rattle snakes and a few prairie chickens were the only varieties of game noticed. There are several settlers and ranchers in these townships, and the Pend. d'Oreille Northwest Mounted Police post is situated on Milk river in township 2, range 8.—*A. H. Hawkins, D.L.S., 1907.*

3 and 4. The best route for reaching this locality is by way of the police trail from Coutts, a station on the railway owned by the Alberta Railway and Irrigation company, and situated in township 1, range 15. This trail leads directly past these townships, and at the time of my visit (August) was in good condition. The soil is a hard clay, but in places appears to be loamy. I think it is probably best adapted for cattle or sheep raising, except in the bottom lands of the Pend d'Oreille

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 16—Continued.

also several freshwater springs near the edges of the lakes. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Coal for fuel is obtainable about ten miles to the south of this township but wood is very scarce, the nearest obtainable in any quantity being from the Handhills which are about thirty miles south. There is no stone or mineral and no game.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Spiers' ranch in section 16, of this township via the south end of Gough lake, a distance of fifty miles roughly. The soil consists of two to six inches of sandy loam over a hard sandy clay or clay subsoil. In sections 35 and 36 there is some first class land, the soil being deep and the surface level and there is quite a strip of fairly level prairie on the edge of this township which should be described as second class and suitable for mixed farming, but the largest part of the township is steeply rolling prairie and only suitable for ranching purposes. There is no timber of any description. Small hay meadows are scattered all through the township. Water is plentiful there being six permanent lakes, three of which are slightly alkaline and the others fresh, also there are four large freshwater springs in different parts of the township and numerous ponds, some of which are slightly alkaline but most of which are fresh. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Coal for fuel can be obtained in the adjoining township east but wood for fuel is very scarce, the nearest obtainable in any quantity being from the Handhills which are thirty to thirty-five miles south. There is no stone or mineral and no game.—*R. H. Cautley, D.L.S., 1907.*

Range 17.

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills and enters this township in section 30 leaving it in section 4. The soil consists of three to six inches of sandy loam over a sandy or sandy clay subsoil except in the west two miles of the township where the subsoil is more of a gumbo nature. The east part of the township should be described as second class although there is some land adjoining Farrel lake which may be called first class and is suitable for mixed farming, but the west two miles is more suitable for ranching purposes. The surface is gently rolling in character, and there is very little brush except for a narrow strip along the south shore of Farrel lake where there is some small grey willow. There is no timber of any description. There are small hay meadows scattered all through the township and three or four hundred tons of upland hay can be cut in sections 25, 26 and 27, along the edge of Farrel lake. Water is fairly plentiful, there being five permanent lakes, two of which are slightly alkaline and milky in appearance, the others including Farrel lake are fresh water. Farrel lake stretches right across this township from east to west, and averages about three quarters of a mile in width, it is about eight feet deep and the water is fresh although rather milky in appearance owing to some white salt which is held in suspension although cattle like it very much. There are also two spring-fed creeks which run into Farrel lake and which have deep pools of water along their course. No water-power can be developed. The climate is similar to that in the Stettler district, and summer frosts are rare. Wood for fuel is very scarce, but coal can be obtained about fifteen miles southeast of the township. There is no stone or mineral and no game.—*R. H. Cautley, D.L.S., 1907.*

TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 17—Continued.

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway via the south end of Gough lake and passes through this township, entering it in section 30 and leaving it in section 1. The soil consists of three to six inches of sandy loam over a hard sandy clay or clay subsoil and should be described as second class, except in the south part of the township, where, owing to the hilly nature of the country, it should be described as between second and third class. The north four miles of the township are suitable for mixed farming and the south two miles would make good ranching country. The north four miles of this township are gently rolling to rolling prairie, and the south two miles are rolling to steeply rolling prairie and there is considerable grey willow brush around the edges of sloughs and pounds. There is no timber of any description. There are numerous small hay meadows scattered all through the township. The supply of water is abundant, there being thirteen permanent lakes in this township, including part of Farrell lake, all of which are fresh water except No. 3, in which the water is slightly alkaline and very milky in appearance, owing to some white salt held in suspension. Besides these lakes there are numerous fresh water ponds, scattered all through the township. No water-power can be developed. The climate is similar to that in the Stettler district and summer frosts are rare. Wood for fuel is to be found in small quantities around ponds and sloughs, where there is a grey willow from two to three inches in diameter. There are no coal or lignite veins in this vicinity. There is no stone or mineral, and no game in the township.—*R. H. Cautley, D.L.S., 1907.*

Range 18.

29. The best route for reaching this township is either from Gleichen to Percieville on the Red Deer river across the government ferry and thence to the township by the trail over the Handhills, or from Stettler to the Imperial ranch in township 33, range 18, and thence across the prairie. Both trails are very good, but the latter obviates the river crossing and the high hills close to the river. The soil is usually a good loam suitable especially for grazing and mixed farming. The surface is open prairie, with no timber nor hay of any value. The water in Michichi and Willow creeks is good, but the supply is limited, both streams drying up in the summer. A few springs on the east boundary give a permanent supply in their immediate locality. There is no water-power available. Some frosts occur in June, July and September. The climate is similar to that of the district north of Gleichen. Coal is found in the surrounding townships east and west, but no coal or lignite was found in this township. There are no stone quarries and no minerals of economic value as far as observed. No game was seen in this township. The dipping station for the district north of Red Deer river is on the east boundary of this township.—*C. C. Fairchild, D.L.S., 1907.*

30. This township is best reached from Stettler over a good trail via Imperial ranch. The soil is clay with spots of black loam and gumbo suitable for ranching. The surface is prairie with no timber of any value and no hay. The water in Michichi creek is good but the supply is not sufficient as the creek goes dry in both branches in a dry season. The lake shown on the east boundary of section 31 is alkaline. There is no water-power available. The climate is rather drier than the surrounding district, and at present subject to summer frosts. No coal was found in the township, but it is easily obtained from Michichi creek to the west or in the Handhills to the southeast. There is no stone quarry in the township and no eco-

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 18—Continued.

conomic minerals were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907*

31. The township is best reached by trail from Stettler over a good trail via Imperial ranch. The soil is chiefly clay and a gumbo suitable for ranching. The surface is open prairie with no timber. About 300 acres of coarse hay is found in the southwest corner on the north boundaries of sections 31 and 32. Water in spring is good, but the creeks are alkaline and run dry in summer. A spring in section 29 is the only permanent supply. There is no water-power in this township. The climate is dry with some summer frosts. There are no coal or lignite veins in the township, but coal is found in Michichi creek to the southwest. No stone quarries or minerals of economic value were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

32. This township is most conveniently reached by trail from Stettler; the trail is good. The soil is chiefly clay and gumbo, and is suitable for ranching. The surface is open prairie with no timber. A course hay slough on section 20 contains about one hundred acres. There are no creeks with running water, and no water-powers. The climate is dry with some summer frosts. No coal, lignite, stone quarries or minerals of economic value were observed. No game was seen in this township. There was no water fit for camp use in this township and this survey was made from a camp in township 31, range 18.—*C. C. Fairchild, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills and which passes through sections 35, 36, and 25 of this township. There is also a trail which branches off the above mentioned trail in township 34, range 18, and runs to the Gopher Head ranch in section 32 of this township. The soil consists of three to six inches of sand loam over a sandy clay or clay subsoil, and should be described as being between second and third class; part of this township is suitable for ranching purposes. The country is gently rolling prairie, and there is very little brush except in the extreme westerly part of the township, where there is some grey willow from two to three inches in diameter. There is no timber of any description. There are small hay meadows scattered all through the township. Water is rather scarce, there being only two permanent lakes, including Farrell lake, which just enters the northeast corner of this township and which is fresh water, the other lake in section 21 is slightly alkaline and rather milky in appearance. There is a spring fed creek which flows through this township into Farrell lake which has pools of water along its course, and there is a good fresh water spring in section 32. No water-power can be developed. The climate is similar to that of the Stettler district, and summer frosts are rare. Wood for fuel can be obtained in small quantities in the west part of this township and the township west of it where there are scattered clumps of gray willow from two to three inches in diameter. There are no lignite veins, coal, stone or mineral, and there is no game.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills and which passes through this township, entering it in section 31 and leaving it in section 2. Another branch of this trail, which runs east of Farrell lake, enters this township in section 34 and leaves it in section 25. There is also a good trail running to the Gopher Head ranch, in township 33, range 18, which branches off the first mentioned trail in section 19, and leaves the township in section 5. The soil consists

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 12—Continued.

sandy and clay loam with a clay subsoil and supports a fair growth of grass. There are no hay lands of any value, no timber, no quarries and no indications of coal or other minerals within the township.—*C. A. Magrath, D.L.S., 1907.*

Range 13.

2. The best road to reach this township is along the very excellent trail used by the Royal Northwest Mounted Police officers from Coutts, a station on the railroad owned by the Alberta railway and Irrigation company, in township 1, range 15 and distant about ten miles. The soil is a clay or sandy loam with patches of clay and gravel, but owing to the very dry seasons this locality is probably best adapted for sheep or cattle raising. The surface is rolling prairie, the southwestern portion being traversed by Milk river. The only timber found is in the valley of this river consisting chiefly of willow, cottonwood and poplar in very limited quantities. There were no hay lands observed in this township. The only water of consequence is Milk river, the water of which is fresh. During the summer months it is very low and has ceased to flow on several occasions. The bottom lands along the valley are subject to flooding during the spring freshets, the depth varying with the season. There are no available water-powers. The climate is equable with occasionally a summer frost but this entire locality is subject to very strong winds. Coal is the fuel most readily available and may be procured at Coutts. A small quantity of wood is found on Milk river, consisting chiefly of small dry willows. Sandstone in unlimited quantities may be obtained on Milk river and is of sufficiently good quality to be used as building material. No minerals of economic value were noticed. Coyotes, foxes, badgers, a few beavers and prairie chicken were the only game seen in this township. There are two settlers in the township, both of whom devote their attention to raising cattle and horses rather than farming.—*A. H. Hawkins, D.L.S., 1906.*

8. The surface of this township varies from level to gently rolling prairie. Some depressions or coulées occur in the southern portion of the township and surface stones are found in some of these coulées. The soil is a clay and sandy loam and has a depth of from 8 to 12 inches. There is a fair growth of grass in the township. Water, from recent heavy rains, was available in some small sloughs. There are no hay lands of any value, no timber, no quarries and no indications of coal or other minerals within the township.—*C. A. Magrath, D.L.S., 1907.*

65. The township is crossed from section 3 to section 31 by the public road going to Lac la Biche. The soil consists of a layer of black loam averaging five to six inches with a subsoil of clay or sandy clay, with stones in several places. The soil of about one-half of the quarter sections is first class, while that of a great part of the rest is second class. The township is fairly good for farming. It is well timbered, except a strip that extends from section 31 to section 1 consisting of open spots, or brush and small poplar. The timber is mostly poplar. In places cottonwood and birch are met with. Spruce and tamarack are seen only in small bunches, on more than one-third of the section lines, especially in the north and west of the township. The open spots seen in sections 29, 30, 31 and 32 give a limited supply of prairie hay. Slough hay is cut mostly around Hay lake. All the hay cut in the township will not amount to more than a few hundreds of tons. The water in the lakes is not fit to drink. That of Little Beaver creek is good. This creek traverses section 31. It nearly ran dry in the summer of 1906. Lacroix lake could be used to generate water-power in the spring, but in dry summers very little water flows out of it. The climate appears to be a little colder than that of Edmonton, although the winter of 1906-1907

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN:

Range 19—Continued.

ate is rather dry and summer frosts were observed in June and July. Coal is obtainable to the south and west along Red Deer river and Michichi creek. No coal or lignite was found in the township. There are no stone quarries and no economic minerals. A few antelope were seen.—*C. C. Fairchild, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Gopher Head ranch in section 32, township 33, range 18, one and one-half miles across prairie from the east boundary of this township. The soil consists of from two to six inches of sandy loam over a sandy clay or clay subsoil, and should be described as third class land owing to the hilly nature of the country, except for a few quarter sections in sections 17, 18, 19 and 20, which being fairly level may be called second class. This township is suitable for ranching purposes. The surface is steeply rolling prairie and there are scattered clumps of gray willow from two to three inches in diameter, with some small poplar all through the township. There is no timber of any description, but there are small hay meadows scattered all through the township. Water is plentiful, as there are numerous deep fresh water ponds all through the township, especially in the north half. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel can be obtained in small quantities all through the township. There are no lignite veins, coal, stone or mineral. No game is found.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills, and which passes through section 30 of township 34, range 18, three-quarters of a mile across prairie from the east boundary of this township. The soil averages from three to six inches of sandy loam, over a sandy clay or clay subsoil and must be described as third class owing to the hilly nature of the country; it is suitable for ranching purposes. There are a few quarter sections in the northeasterly part of the township which are fairly level and may be called second class, which are suitable for mixed farming. The surface is generally steeply rolling prairie, with scattered clumps of gray willow from two to three inches in diameter and some small poplar. There is no timber of any description, but there are small hay meadows scattered all through the township. Water is plentiful, there being numerous fresh water ponds all through the township. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel can be obtained in small quantities all through the township. There are no lignite veins, coal, stone or mineral. No game is found.—*R. H. Cautley, D.L.S., 1907.*

66. The pack trail from Athabaska Landing to Lac la Biche crosses this township on sections 30, 29, 28, 27, 26 and 25 and was opened for wagons by me as far as section 27. It is a good trail though rough in places. Black loam and clay subsoil prevails in the twelve northern sections but the southern part of the township is generally covered with swamps and muskeg, though patches of fairly good land are found all through it. It is suitable for mixed farming. The surface is all covered with a growth of spruce, poplar and willow mostly dry. There is no timber of any value. About fifty tons of hay can be cut on the south of sections 4 and 5. There is an ample supply of fresh water from lakes on sections 17, 22, 26, and also from Flat lake on sections 6, 7 and 18. Flat lake creek is a stream about fifty links wide by one foot deep and flows in sections 8, 19, 30 and 31 where it joins Pine creek. No land is liable

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 14—Continued.

traversed by Milk river. The only timber found is in the valley of this river consisting chiefly of willow, cottonwood and poplar in very limited quantities. There was no hay lands observed in this township. The only water of consequence is Milk river, the water of which is fresh. During the summer months it is very low and has ceased to flow on several occasions. The bottom lands along the valley are subject to flooding during the spring freshets, the depth varying with the season. There are no available water-powers. The climate is equable with occasionally a summer frost, but this entire locality is subject to very strong winds. Coal is the fuel most readily available and may be procured at Coutts. A small quantity of wood is found on Milk river, consisting chiefly of small dry willows. Sandstone in unlimited quantities may be obtained on Milk river and is of sufficiently good quality to be used as building material. No minerals of economic value were noticed. Coyote, fox, badger, a few beaver and prairie chicken were the only game seen in this township. There are two settlers in the township, both of whom devote their attention to raising cattle and horses rather than farming.—*A. H. Hawkins, D.L.S., 1906.*

33. The best route for reaching this township is by a good wagon trail, which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Hunt's ranch in section 17, township 34, range 15, from there it is ten miles across prairie to the centre of this township. The soil consists of two to six inches of sandy loam with a hard sandy clay or clay subsoil, and should be described as being between second and third class. It is suitable for ranching purposes and to a lesser degree for mixed farming. The surface is generally undulating or rolling prairie, but in the south of this township the surface is rolling or steeply rolling. There is no timber of any description. Small hay meadows are scattered all through the township. Water is rather scarce in this township, there are two permanent lakes one in section 29 being six feet deep and containing fresh water, the other in section 1, being four feet deep and alkaline. There are two small creeks of fresh water running through this township which were almost dry at the time of survey (October), but there were pools of fresh water all along their beds. No water-power can be developed. The climate is similar to the Stettler district, summer frosts being rare. Coal for fuel can be obtained in this township in section 36, there is a small seam about 18 inches thick, where ranchers have already commenced mining it, and in sections 11 and 18 there are outcroppings of a small seam. Wood for fuel is very scarce and the nearest obtainable in any quantity is from the Handhills about thirty miles south. There is no stone or mineral. Antelope in small numbers is the only kind of game.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Hunts' ranch in section 17, township 34, range 15, from there it is twelve miles across prairie round the south end of Sullivan lake, to the centre of this township. The soil consists of three to four inches of sandy loam with a hard sandy clay or clay subsoil and should be described as being between second and third class. It is suitable for ranching purposes and to a lesser degree for mixed farming. The surface is undulating prairie. There is no timber of any description. Small hay meadows are scattered all through the township. Sullivan lake, which takes up one-third of this township, is very shallow in most places, and the water is slightly alkaine and very muddy, a great quantity of a fine whitish clay being held in suspension. Several small fresh water springs flow into the lake in this township and water should be easily obtained by digging wells. No water-power can be developed. The climate is similar to the Stettler district, and summer frosts are rare. Coal for fuel can be obtained just south

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 20—Continued.

in the township. Water may be obtained in Michichi creek at the southeast corner and in the various sloughs and small lakes in the northern part, none of which are alkaline. There is no danger of floods and no water-powers. The climate is dry with an occasional summer frost. Coal may be obtained for fuel from the valley of Red Deer river to the west. There are no stone quarries and no economic minerals were observed. No game was seen.—*C. C. Fairchild, D.L.S., 1907.*

32. This township is best reached from Stettler over a good trail. The soil is a tough clay loam suitable for ranching and mixed farming. There is no timber in the township. Some hay is cut near the west boundary on an area of about one hundred acres. Plenty of fresh water is obtainable in the lakes. There is no danger of flooding and no water-power. The climate is dry with an occasional summer frost. Coal for fuel is obtainable from Red Deer river valley to the west. There are no stone quarries and no economic minerals. A considerable number of duck and geese were seen on the lakes.—*C. C. Fairchild, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway, to the Hand hills, via Big Valley creek, and which passes through this township, entering it in section 33 and leaving it in section 1. The soil averages from three to six inches of black loam over a hard clay or sandy subsoil, and may be described as mostly third class and suitable only for ranching purposes, although in the north part of the township there are some fairly level quarter sections, which may be called second class, and are suitable for mixed farming. The northwest and east parts of this township are steeply rolling prairie, with scattered clumps of gray willow and some small poplar, but the central and southwest parts are fairly level and open prairie. There is no timber of any description but there are small hay meadows scattered all through the township. Fresh water is fairly plentiful in the hilly parts of this township, there being numerous fresh water ponds, but in the level parts the water is alkaline and scarce. Mudspring lake, a large lake in the centre of the township, is about five feet deep and is quite alkaline, the water being very milky. The edge of this lake is very soft and all around the lake are to be found mudsprings from four to fifteen feet in diameter and extending to a considerable depth, which I was not able to ascertain, but it was more than twelve feet. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel is obtainable in small quantities in the northwest and extreme east parts of this township, where there is some dry willow from two to three inches in diameter. There are no lignite veins, coal, stone or mineral. No game is found.—*R. H. Cautley, D.L.S., 1907.*

65. A fairly good trail crosses the township on sections 18, 17, 9, 3, 2, and 12. About sixty per cent of this township is swampy but the remaining forty per cent has about four inches of black loam with a clay subsoil suitable for mixed farming. The surface is all wooded with poplar, willow and spruce from three to six inches in diameter. There is no timber of any value. About one hundred tons of hay could be cut on the west side of Flat lake. Flat lake covers about ten sections of this township and Pine creek touches the northwest corner of section 31. This, with several small creeks flowing into Flat lake, gives an ample supply of fresh water. There is no water-power. The climate is good and there is no indication of summer frost. Wood for fuel can be obtained on every quarter section but no lignite veins were observed. No mineral of any value was seen in the township. Very little game was seen. Flat

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 15—Continued.

Some was found in the pits on the north boundary of section 31. There are no stone quarries or minerals of economic value. Duck, geese and prairie chicken were seen in considerable numbers. The soil produces excellent grass, and there are springs and sloughs where good water is to be had, making this a good location for ranching, but the surface is too rough for agricultural purposes.—*Geo. Edwards, D.L.S., 1907.*

30. This township is accessible by trail from Stettler or Gleichen, the distance either way being about the same, and the trails being in good condition. The soil is chiefly clay, producing good grass and suitable for ranching purposes. The surface is prairie without any timber. There is some rolling land in the northeast quarter of the township, but fully two-thirds of the area is very hilly. There are no hay sections of any considerable extent. Water is to be found only in a few sloughs. There are no streams. The climate is good. There does not appear to be any special danger from summer frosts. There is no apparent fuel supply in the township. Coal is obtainable in the next adjoining township south. There are no stone quarries or minerals of economic value. No game was to be seen. The township is suitable for ranching, but too rough for agricultural purposes.—*Geo. Edwards, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Hunts' ranch in section 17, township 34, range 15, some three miles across prairie from the north boundary of this township. The soil consists of three to four inches of sandy loam over a hard sandy clay or clay subsoil, and should be described as third class, it is suited only for ranching purposes, as the surface is steeply rolling prairie. There is no timber of any description but a few small hay meadows scattered all through the township. Water is very scarce; a few small fresh water ponds which are liable to dry up in summer are to be found and there are two small springs in the west part of the township. No water-power can be developed. The climate is similar to that in the Stettler district and summer frosts are rare. Coal for fuel can be obtained in the adjoining townships north and east. Wood for fuel is very scarce, the nearest obtainable in any quantity being from the Hand hills, which are about thirty miles south. There is no stone or mineral. Antelope in small numbers is the only kind of game.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Hunts' ranch in section 17 of this township, a distance of fifty-five miles roughly. The soil consists of three to six inches of sandy loam over a hard sandy clay or clay subsoil, and should be described as second class in the north part of the township and between second and third class in the south four miles, where it is very rolling. This would make a good ranching locality and the north part is suitable for mixed farming. The north part of the township is undulating and the south four miles is rolling or steeply rolling prairie. There is no timber of any description. Small hay meadows are scattered all through the township. Sullivan lake, which extends the whole length of this township, on the east sides, is very shallow in most places, the water is slightly alkaline and very muddy, a great quantity of fine whitish clay being held in suspension. There is another permanent lake called Hunt lake in sections 22 and 27, which is also alkaline and muddy. Fresh water is rather scarce though there are a few ponds and a large fresh water spring in section 17, which forms a small creek which flows into Hunt lake. No water-power can be developed. The climate is similar to that in Stettler district and summer frosts are rare. Coal for fuel can be obtained in the northeast quarter of section 34 of this township where there is a one foot seam of

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 21—Continued.

with a depth of three feet and a velocity of about two and one-half miles per hour. There is little danger of flooding and no water-power is available. The climate is fine and dry with occasional summer frosts. Coal is obtainable along the banks of Red Deer river. There are no stone quarries and no economic minerals were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

31. This township may be reached either from Stettler on the east side of Red Deer river and Carbon on the west side of the river over good trails. The soil in the river bottom is mostly hardpan and sand with very little growth. On the high banks the soil is generally a good black loam, suitable for mixed farming. The surface is generally prairie with clumps of cottonwood, poplar and spruce along Red Deer river bottom and in various ravines. Timber will average ten inches in diameter but the quantity is limited and will all be required for the settlers' use. Good upland hay can be obtained on the top of the high banks in large quantities. Plenty of good fresh water was found in Red Deer river, which averages five chains wide, three feet deep and has a velocity of two and one-half miles per hour. There is very little danger of flooding and no water-power is available. The climate is fine and dry with occasional summer frost. Coal for fuel is obtainable along the banks of Red Deer river. There are no stone quarries and no economic minerals were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

65. There is a good trail from Athabaska Landing to the township and the settlers have opened trails to reach mostly any point of the township. The soil is chiefly of black loam underlain by a clay subsoil and is suitable for mixed farming. About sixty per cent of this township is wooded and about forty per cent is scrub or growing poplar distributed all over the township, but no timber of any value is found. There is about one hundred tons of hay along Pine creek. This creek is about twenty feet wide, one foot deep and gives an ample supply of fresh water. There is no water-power and none can be developed. There is no indication of summer frost and the climate is good. Wood as fuel can be obtained on every section but no lignite veins were observed. There are no stone quarries and no minerals of economic value. There is very little game.—*J. L. Côté, D.L.S., 1907.*

67. (*East outline*).—Along this line about forty per cent is a sandy or stony soil while the balance is divided between lakes, muskegs and swamps.—*J. L. Côté, D.L.S., 1907.*

68. (*East outline*).—Athabaska river flows in a northeasterly direction and crosses the line on section 25. The valley is about three hundred feet deep with a comparatively easy incline. The soil along sections 36, 25 and 24 may be classified as second class but along sections 13, 12 and 1 it is generally spruce swamp with some ridges.—*J. L. Côté, D.L.S., 1907.*

Range 22

10 & 11. (*Third correction line*).—The best route for reaching this portion of these townships is by following the road along the correction line, from Leavings, a station in range 26, on the Calgary and Edmonton branch of the Canadian Pacific railway. At the time of my visit (November) this road was in excellent condition. The soil is either clay or sandy loam and is apparently well adapted for farming as proved by the heavy growth of grass and the excellent crops of grain grown in the vicinity. The surface is rolling prairie with one small coulée cutting the eastern boundary. There is neither timber nor brush in these townships. A large pond of water held by a dam, evidently for watering stock, was noticed in the eastern portion of township

TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 16—Continued.

Good upland hay covers nearly half the township. Handhills lake takes up about four square miles of the area. This lake has fallen fully twenty feet within a few years. It formerly was the source of Bullpound creek but there is now no outflow of water. There are a few very small creeks flowing into the lake. The water appears to contain considerable soda, giving it a very soapy appearance and taste. There is a large pool of good water on the east side of the lake, separated from it only by a narrow bar. There are several springs of good water among the hills. The climate is good, summer frosts do not seem to be prevalent. There is no fuel within the township but coal is obtainable within 15 miles both east and west. There are no stone quarries or minerals of economic value. Geese, duck and prairie chicken were plentiful. This township is at present occupied by eight or ten ranchers none of whom have done anything in the way of agriculture. Fully seventy-five per cent of this township would make good farms.—*Geo. Edwards, D.L.S., 1907.*

30. This township can be most conveniently reached by trail from Stettler. The trail is in good order. The soil is chiefly clay or clay loam with gravel subsoil, suitable for general agricultural purposes. The surface is prairie with no timber. There are no large hay meadows, but a considerable portion of the township produces good upland grass which is used for fodder. There are a few small streams and several springs of good water. Bullpound creek traverses this township. It was formerly the outlet of Handhills lake, and a stream of considerable volume, but owing to the level of the lake falling about twenty feet, there is no longer any flow of water from it, and the creek is now merely a chain of pools. The climate is favourable and no special danger of summer frosts. There is coal obtainable near the west boundary of the township in township 30, range 17. There are no stone quarries or minerals of economic value. Duck and prairie chicken were seen. Fully one-half of the township is rolling, or nearly level, and the quality of the soil seems to be excellent for farming purposes. The balance is good grazing land but rather too rough for agricultural purposes.—*Geo. Edwards, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Shellberg's ranch in section 29, of this township, via the south end of Gough lake, a distance of fifty-three miles, roughly. The soil consists of six to eighteen inches of sandy loam in the west half of the township and of three to six inches of sandy loam in the east half, over a sandy clay or clay subsoil. There is some first class land adjoining Farrell lake and all the west half of the township may be described as second class, and suitable for mixed farming. In the east half of the township the soil is not so good and should be described as being between the second and third class suitable for ranching purposes or to a lesser degree for mixed farming. The surface is gently rolling prairie with no timber of any description. There is a large hay meadow on the east boundary of section 32, where fifty or sixty tons of hay can be cut and there are several small hay meadows scattered through the township. Water is fairly plentiful, being supplied by five large lakes including Farrell lake and two small lakes, all of which except Farrell lake are slightly alkaline. Farrell lake which enters this township in sections 30 and 31 is about eight feet deep and the water is fresh although rather milky in appearance owing to some white salt which is held in suspension although cattle like it very much. The other lakes are all shallow and the water is both slightly alkaline and thick owing to some salt in suspension. There are

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 16—Continued.

also several freshwater springs near the edges of the lakes. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Coal for fuel is obtainable about ten miles to the south of this township but wood is very scarce, the nearest obtainable in any quantity being from the Handhills which are about thirty miles south. There is no stone or mineral and no game.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to Spiers' ranch in section 16, of this township via the south end of Gough lake, a distance of fifty miles roughly. The soil consists of two to six inches of sandy loam over a hard sandy clay or clay subsoil. In sections 35 and 36 there is some first class land, the soil being deep and the surface level and there is quite a strip of fairly level prairie on the edge of this township which should be described as second class and suitable for mixed farming, but the largest part of the township is steeply rolling prairie and only suitable for ranching purposes. There is no timber of any description. Small hay meadows are scattered all through the township. Water is plentiful there being six permanent lakes, three of which are slightly alkaline and the others fresh, also there are four large freshwater springs in different parts of the township and numerous ponds, some of which are slightly alkaline but most of which are fresh. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Coal for fuel can be obtained in the adjoining township east but wood for fuel is very scarce, the nearest obtainable in any quantity being from the Handhills which are thirty to thirty-five miles south. There is no stone or mineral and no game.—*R. H. Cautley, D.L.S., 1907.*

Range 17.

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills and enters this township in section 30 leaving it in section 4. The soil consists of three to six inches of sandy loam over a sandy or sandy clay subsoil except in the west two miles of the township where the subsoil is more of a gumbo nature. The east part of the township should be described as second class although there is some land adjoining Farrel lake which may be called first class and is suitable for mixed farming, but the west two miles is more suitable for ranching purposes. The surface is gently rolling in character, and there is very little brush except for a narrow strip along the south shore of Farrel lake where there is some small grey willow. There is no timber of any description. There are small hay meadows scattered all through the township and three or four hundred tons of upland hay can be cut in sections 25, 26 and 27, along the edge of Farrel lake. Water is fairly plentiful, there being five permanent lakes, two of which are slightly alkaline and milky in appearance, the others including Farrel lake are fresh water. Farrel lake stretches right across this township from east to west, and averages about three quarters of a mile in width, it is about eight feet deep and the water is fresh although rather milky in appearance owing to some white salt which is held in suspension although cattle like it very much. There are also two spring-fed creeks which run into Farrel lake and which have deep pools of water along their course. No water-power can be developed. The climate is similar to that in the Stettler district, and summer frosts are rare. Wood for fuel is very scarce, but coal can be obtained about fifteen miles southeast of the township. There is no stone or mineral and no game.—*R. H. Cautley, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN

Range 17—Continued.

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway via the south end of Gough lake and passes through this township, entering it in section 30 and leaving it in section 1. The soil consists of three to six inches of sandy loam over a hard sandy clay or clay subsoil and should be described as second class, except in the south part of the township, where, owing to the hilly nature of the country, it should be described as between second and third class. The north four miles of the township are suitable for mixed farming and the south two miles would make good ranching country. The north four miles of this township are gently rolling to rolling prairie, and the south two miles are rolling to steeply rolling prairie and there is considerable grey willow brush around the edges of sloughs and ponds. There is no timber of any description. There are numerous small hay meadows scattered all through the township. The supply of water is abundant, there being thirteen permanent lakes in this township, including part of Farrell lake, all of which are fresh water except No. 3, in which the water is slightly alkaline and very milky in appearance, owing to some white salt held in suspension. Besides these lakes there are numerous fresh water ponds, scattered all through the township. No water-power can be developed. The climate is similar to that in the Stettler district and summer frosts are rare. Wood for fuel is to be found in small quantities around ponds and sloughs, where there is a grey willow from two to three inches in diameter. There are no coal or lignite veins in this vicinity. There is no stone or mineral, and no game in the township.—*R. H. Cautley, D.L.S., 1907.*

Range 18.

29. The best route for reaching this township is either from Gleichen to Percieville on the Red Deer river across the government ferry and thence to the township by the trail over the Handhills, or from Stettler to the Imperial ranch in township 83, range 18, and thence across the prairie. Both trails are very good, but the latter obviates the river crossing and the high hills close to the river. The soil is usually a good loam suitable especially for grazing and mixed farming. The surface is open prairie, with no timber nor hay of any value. The water in Michichi and Willow creeks is good, but the supply is limited, both streams drying up in the summer. A few springs on the east boundary give a permanent supply in their immediate locality. There is no water-power available. Some frosts occur in June, July and September. The climate is similar to that of the district north of Gleichen. Coal is found in the surrounding townships east and west, but no coal or lignite was found in this township. There are no stone quarries and no minerals of economic value as far as observed. No game was seen in this township. The dipping station for the district north of Red Deer river is on the east boundary of this township.—*C. C. Fairchild, D.L.S., 1907.*

30. This township is best reached from Stettler over a good trail via Imperial ranch. The soil is clay with spots of black loam and gumbo suitable for ranching. The surface is prairie with no timber of any value and no hay. The water in Michichi creek is good but the supply is not sufficient as the creek goes dry in both branches in a dry season. The lake shown on the east boundary of section 31 is alkaline. There is no water-power available. The climate is rather drier than the surrounding district, and at present subject to summer frosts. No coal was found in the township, but it is easily obtained from Michichi creek to the west or in the Handhills to the southeast. There is no stone quarry in the township and no eco-

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 18—Continued.

conomic minerals were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907*

31. The township is best reached by trail from Stettler over a good trail via Imperial ranch. The soil is chiefly clay and a gumbo suitable for ranching. The surface is open prairie with no timber. About 300 acres of coarse hay is found in the southwest corner on the north boundaries of sections 31 and 32. Water in spring is good, but the creeks are alkaline and run dry in summer. A spring in section 29 is the only permanent supply. There is no water-power in this township. The climate is dry with some summer frosts. There are no coal or lignite veins in the township, but coal is found in Michichi creek to the southwest. No stone quarries or minerals of economic value were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

32. This township is most conveniently reached by trail from Stettler; the trail is good. The soil is chiefly clay and gumbo, and is suitable for ranching. The surface is open prairie with no timber. A course hay slough on section 20 contains about one hundred acres. There are no creeks with running water, and no water-powers. The climate is dry with some summer frosts. No coal, lignite, stone quarries or minerals of economic value were observed. No game was seen in this township. There was no water fit for camp use in this township and this survey was made from a camp in township 31, range 18.—*C. C. Fairchild, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills and which passes through sections 35, 36, and 25 of this township. There is also a trail which branches off the above mentioned trail in township 34, range 18, and runs to the Gopher Head ranch in section 32 of this township. The soil consists of three to six inches of sand loam over a sandy clay or clay subsoil, and should be described as being between second and third class; part of this township is suitable for ranching purposes. The country is gently rolling prairie, and there is very little brush except in the extreme westerly part of the township, where there is some grey willow from two to three inches in diameter. There is no timber of any description. There are small hay meadows scattered all through the township. Water is rather scarce, there being only two permanent lakes, including Farrell lake, which just enters the northeast corner of this township and which is fresh water, the other lake in section 21 is slightly alkaline and rather milky in appearance. There is a spring fed creek which flows through this township into Farrell lake which has pools of water along its course, and there is a good fresh water spring in section 32. No water-power can be developed. The climate is similar to that of the Stettler district, and summer frosts are rare. Wood for fuel can be obtained in small quantities in the west part of this township and the township west of it where there are scattered clumps of gray willow from two to three inches in diameter. There are no lignite veins, coal, stone or mineral, and there is no game.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills and which passes through this township, entering it in section 31 and leaving it in section 2. Another branch of this trail, which runs east of Farrell lake, enters this township in section 34 and leaves it in section 25. There is also a good trail running to the Gopher Head ranch, in township 33, range 18, which branches off the first mentioned trail in section 19, and leaves the township in section 5. The soil consists

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Range 18—Continued.

of from three to nine inches of sandy loam over a sandy clay or clay subsoil, except in the extreme north part of the township where the subsoil is largely gumbo. The land may be described as being between second and third class. Part of this township is suitable for mixed farming and it is all suitable for reaching purposes. The surface is gently rolling to rolling prairie in the south part of the township and level or undulating prairie in the north two miles and there are scattered clumps of gray willow from two to three inches in diameter with small poplar in the south half of the township. There is no timber of any description, but there are small hay meadows scattered all through the township, and there are large hay marshes in sections 29, 30, 31, and 32, where about seven hundred tons of very poor quality hay can be cut, the hay in these marshes being thin and largely fox tail. Water is plentiful in the south half of the township where there are numerous ponds, most of which are fresh water. But in the north half of the township water is very scarce. There are two permanent lakes, including a small part of Farrell lake, which is fresh water, the other lake being slightly alkaline and milky in appearance. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel can be obtained in small quantities in the south half of this township, where there is some dry willow from two to three inches in diameter. There are no lignite veins, coal, stone or mineral. There is no game.—*R. H. Caut'ey, D.L.S., 1907.*

Range 19.

29. This township is most easily reached from Gleichen via Rosebud creek over a good trail. The soil is generally a heavy clay loam suitable for mixed farming. The surface is rolling prairie, but Michichi creek cuts through the township in the bottom of the coulée from one hundred and fifty to two hundred and fifty feet deep. There is considerable scrub and some timber suitable for fencing along the coulée bottom and sides. A considerable quantity of upland hay is cut in the township every year, aggregating to about one thousand ton. The water in Michichi creek is very good, but it dries up in the summer season, only a few springs being left, which furnish sufficient water the year around. There is no water-power. The climate is rather dry and summer frosts were observed in June and July. Coal is found in the township along Michichi creek in considerable quantities. There are no stone quarries in the township and no economic minerals were observed. A few deer were seen in the creek.

30. This township surface is generally suitable for mixed farming. The water dries up in the summer season, only a few springs being left. Coal is found in the township along Michichi creek in considerable quantities. There are no stone quarries and no economic minerals were observed. A few deer were seen in the creek.
C. C. Fairchild,

31. This township surface is generally suitable for mixed farming. The water dries up in the summer season, only a few springs being left. Coal is found in the township along Michichi creek in considerable quantities. There are no stone quarries and no economic minerals were observed. A few deer were seen in the creek.

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN:

Range 19—Continued.

ate is rather dry and summer frosts were observed in June and July. Coal is obtainable to the south and west along Red Deer river and Michichi creek. No coal or lignite was found in the township. There are no stone quarries and no economic minerals. A few antelope were seen.—*C. C. Fairchild, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Gopher Head ranch in section 32, township 33, range 18, one and one-half miles across prairie from the east boundary of this township. The soil consists of from two to six inches of sandy loam over a sandy clay or clay subsoil, and should be described as third class land owing to the hilly nature of the country, except for a few quarter sections in sections 17, 18, 19 and 20, which being fairly level may be called second class. This township is suitable for ranching purposes. The surface is steeply rolling prairie and there are scattered clumps of gray willow from two to three inches in diameter, with some small poplar all through the township. There is no timber of any description, but there are small hay meadows scattered all through the township. Water is plentiful, as there are numerous deep fresh water ponds all through the township, especially in the north half. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel can be obtained in small quantities all through the township. There are no lignite veins, coal, stone or mineral. No game is found.—*R. H. Cautley, D.L.S., 1907.*

34. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway to the Handhills, and which passes through section 30 of township 34, range 18, three-quarters of a mile across prairie from the east boundary of this township. The soil averages from three to six inches of sandy loam, over a sandy clay or clay subsoil and must be described as third class owing to the hilly nature of the country; it is suitable for ranching purposes. There are a few quarter sections in the northeasterly part of the township which are fairly level and may be called second class, which are suitable for mixed farming. The surface is generally steeply rolling prairie, with scattered clumps of gray willow from two to three inches in diameter and some small poplar. There is no timber of any description, but there are small hay meadows scattered all through the township. Water is plentiful, there being numerous fresh water ponds all through the township. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel can be obtained in small quantities all through the township. There are no lignite veins, coal, stone or mineral. No game is found.—*R. H. Cautley, D.L.S., 1907.*

66. The pack trail from Athabaska Landing to Lac la Biche crosses this township on sections 30, 29, 28, 27, 26 and 25 and was opened for wagons by me as far as section 27. It is a good trail though rough in places. Black loam and clay subsoil prevails in the twelve northern sections but the southern part of the township is generally covered with swamps and muskeg, though patches of fairly good land are found all through it. It is suitable for mixed farming. The surface is all covered with a growth of spruce, poplar and willow mostly dry. There is no timber of any value. About fifty tons of hay can be cut on the south of sections 4 and 5. There is an ample supply of fresh water from lakes on sections 17, 22, 26, and also from Flat lake on sections 6, 7 and 18. Flat lake creek is a stream about fifty links wide by one foot deep and flows in sections 8, 19, 30 and 31 where it joins Pine creek. No land is liable

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Range 19—Continued.

to be flooded. There is no water-power, and no indication of summer frost. Wood as fuel can be obtained on every quarter section. There is no lignite visible in the township. There are no stone quarries, nor minerals of economic value in sight in the township.—Game is scarce.—*J. L. Cote, D.L.S., 1907.*

67. (*East outline*).—The soil is very fair along sections 36, 25 and 24. Pine creek crosses the line on section 25 and a lake is struck on section 24 which is about three miles long by one wide. There is a large supply of fresh water but there is no water-power. The climate is good and there is no summer frost. The country is all wooded with poplar and spruce, but there is no timber of any value. There are no stone quarries nor any mineral of value.—*J. L. Cote, D.L.S., 1907.*

68. (*East outline*).—Swamps seem to cover a large percentage of this country with the exception of a few ridges of sandy soil.—*J. L. Cote, D.L.S., 1907.*

Range 20.

29. This township is best reached from Gleichen on the main line of the Canadian Pacific railway, via Rosebud creek. The trail is very good except the last ten miles which is very rough. The soil in the river bottom is generally hardpan or sand and unsuitable for farming. On the top of the high bank is a heavy clay loam suitable for mixed farming. The surface is generally prairie with small clumps of timber along each side of Red Deer river and in the bottom of Michichi creek coulees. The timber is cottonwood averaging about eight inches in diameter but not in sufficient quantities to supply the wants of the settlers. There is no hay in this township. There is plenty of good fresh water in Red Deer river and Michichi creek. Red Deer river averages about five chains in width, three feet in depth with a current of two and one-half miles an hour at low water. Michichi creek for the most part dries up in summer time. There is little danger of flooding. There is no water-power available. One or two frosts were observed in June but the climate is generally good but rather dry. Coal of very good quality is obtainable along the banks of the Red Deer river and Michichi creek, the seams varying from two to six feet in thickness at the surface. There are no stone quarries and no economic minerals were observed. Deer, duck, geese, and a few partridges were occasionally seen. The surface of the south half of this township is so badly cut up by Red Deer river, Michichi creek and other ravines averaging two hundred feet in depth with cut banks as to render that portion of the township practically of no value for settlement.—*C. C. Fairchild, D.L.S., 1907.*

30. This township is best reached from Stettler over a good trail. The soil is a very tough clay loam suitable for grazing or mixed farming and the surface is prairie with no timber. There are a few small hay sloughs in the central part of the township. Water can be obtained in Michichi creek in the eastern part of the township and one spring in Fox coulée in section 5. The water is fresh but the supply is rather small. There is no danger from flooding and no water-power. The climate is dry with an occasional summer frost. Coal for fuel can be obtained from the township to the south and west along Red Deer river. There are no stone quarries and no economic minerals. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

31. This township is best reached from Stettler over a good trail. The south two-thirds of this township is a tough clay loam suitable for grazing and mixed farming. The balance is very hilly with numerous small sloughs. There is no timber nor hay

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Range 20—Continued.

in the township. Water may be obtained in Michichi creek at the southeast corner and in the various sloughs and small lakes in the northern part, none of which are alkaline. There is no danger of floods and no water-powers. The climate is dry with an occasional summer frost. Coal may be obtained for fuel from the valley of Red Deer river to the west. There are no stone quarries and no economic minerals were observed. No game was seen.—*C. C. Fairchild, D.L.S., 1907.*

32. This township is best reached from Stettler over a good trail. The soil is a tough clay loam suitable for ranching and mixed farming. There is no timber in the township. Some hay is cut near the west boundary on an area of about one hundred acres. Plenty of fresh water is obtainable in the lakes. There is no danger of flooding and no water-power. The climate is dry with an occasional summer frost. Coal for fuel is obtainable from Red Deer river valley to the west. There are no stone quarries and no economic minerals. A considerable number of duck and geese were seen on the lakes.—*C. C. Fairchild, D.L.S., 1907.*

33. The best route for reaching this township is by a good wagon trail which runs from Stettler on the Lacombe branch of the Canadian Pacific railway, to the Hand hills, via Big Valley creek, and which passes through this township, entering it in section 33 and leaving it in section 1. The soil averages from three to six inches of black loam over a hard clay or sandy subsoil, and may be described as mostly third class and suitable only for ranching purposes, although in the north part of the township there are some fairly level quarter sections, which may be called second class, and are suitable for mixed farming. The northwest and east parts of this township are steeply rolling prairie, with scattered clumps of gray willow and some small poplar, but the central and southwest parts are fairly level and open prairie. There is no timber of any description but there are small hay meadows scattered all through the township. Fresh water is fairly plentiful in the hilly parts of this township, there being numerous fresh water ponds, but in the level parts the water is alkaline and scarce. Mudspring lake, a large lake in the centre of the township, is about five feet deep and is quite alkaline, the water being very milky. The edge of this lake is very soft and all around the lake are to be found mudsprings from four to fifteen feet in diameter and extending to a considerable depth, which I was not able to ascertain, but it was more than twelve feet. No water-power can be developed. The climate is similar to that of the Stettler district and summer frosts are rare. Wood for fuel is obtainable in small quantities in the northwest and extreme east parts of this township, where there is some dry willow from two to three inches in diameter. There are no lignite veins, coal, stone or mineral. No game is found.—*R. H. Cautley, D.L.S., 1907.*

65. A fairly good trail crosses the township on sections 18, 17, 9, 3, 2, and 12. About sixty per cent of this township is swampy but the remaining forty per cent has about four inches of black loam with a clay subsoil suitable for mixed farming. The surface is all wooded with poplar, willow and spruce from three to six inches in diameter. There is no timber of any value. About one hundred tons of hay could be cut on the west side of Flat lake. Flat lake covers about ten sections of this township and Pine creek touches the northwest corner of section 31. This, with several small creeks flowing into Flat lake, gives an ample supply of fresh water. There is no water-power. The climate is good and there is no indication of summer frost. Wood for fuel can be obtained on every quarter section but no lignite veins were observed. No mineral of any value was seen in the township. Very little game was seen. Flat

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Range 20—Continued.

lake creek as the name indicates is rather shallow. It could be dug, being very rapid in some places, and thereby improve a large area of land in this township.—*J. L. Côté, D.L.S., 1907.*

66. The trail from Athabaska Landing to Lac la Biche, crosses this township from the southwest to the northeast corner. About fifty per cent of this township has a black loam soil with clay subsoil and is fit for mixed farming. The balance is spruce swamp. This township is all wooded with poplar, spruce and willow but there is no timber of any value. About one hundred tons of hay can be cut along Pine creek. Flat lake covers about two sections of the southeast corner and Pine creek crosses from the southwest to the northeast corner of this township. Both give a very good supply of fresh water. There is no water-power. Wood as fuel can be obtained on every section but no lignite veins were observed. There are no stone quarries and no minerals of economic value. Game is very scarce.—*J. L. Côté, D.L.S., 1907.*

67. (*East outlines*).—Along sections 36, 25, 24 and 13 the soil is a black loam with clay subsoil making it very fair. Sections 12 and 1 are in a large spruce swamp with hard bottom which will be drained some day.—*J. L. Côté, D.L.S., 1907.*

68. (*East outlines*).—Swamp and muskegs prevail along this line with an occasional ridge which seems to divide them. The land may be classified as third class.—*J. L. Côté, D.L.S., 1907.*

Range 21.

29. This township is reached either from Stettler on the northeast side of Red Deer river or from Gleichen on the southwest side, over good trails. The soil in the river bottom and along Kneehills creek coulée is mostly hardpan and sand. On the high banks the soil is generally a good black loam suitable for mixed farming. The surface is generally prairie with clumps of cottonwood spruce and poplar along the river banks, in the Kneehills creek and in the ravines adjoining these. The timber averages ten inches in diameter, although there are some trees measuring two feet in diameter in the river bottom; it will all be required by the settlers. Good upland hay can be obtained on the top of the high banks in large quantities. Plenty of good fresh water is obtainable from Red Deer river and Kneehills creek. A few springs are found in this township. Red Deer river has an average width of about five chains, a depth of three feet and a current of two and one-half miles per hour. There is little danger of flooding, and no water-power is available. The climate is dry with occasional summer frosts. Coal is obtainable along the banks of Red Deer river. There are no stone quarries and no economic minerals were observed. A few deer were seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

30. This township is reached either from Stettler on the east side of Red Deer river, and Carbon on the west side of the river over good trails. The soil in the river bottoms is mostly hardpan and sand with very little growth. On the high banks the soil is generally a good clay loam and black loam suitable for mixed farming. The surface is generally prairie with clumps of cottonwood, poplar and spruce along Red Deer river bottom and in the various ravines. Timber will average ten inches in diameter but the quantity is limited and will all be required for the settlers' use. Good upland hay can be obtained on the top of the high banks of the river in large quantities. Plenty of good fresh water is found in Red Deer river and in Threehills creek on the southwest side. Red Deer river has a width averaging about five chains.

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Range 21—Continued.

with a depth of three feet and a velocity of about two and one-half miles per hour. There is little danger of flooding and no water-power is available. The climate is fine and dry with occasional summer frosts. Coal is obtainable along the banks of Red Deer river. There are no stone quarries and no economic minerals were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

31. This township may be reached either from Stettler on the east side of Red Deer river and Carbon on the west side of the river over good trails. The soil in the river bottom is mostly hardpan and sand with very little growth. On the high banks the soil is generally a good black loam, suitable for mixed farming. The surface is generally prairie with clumps of cottonwood, poplar and spruce along Red Deer river bottom and in various ravines. Timber will average ten inches in diameter but the quantity is limited and will all be required for the settlers' use. Good upland hay can be obtained on the top of the high banks in large quantities. Plenty of good fresh water was found in Red Deer river, which averages five chains wide, three feet deep and has a velocity of two and one-half miles per hour. There is very little danger of flooding and no water-power is available. The climate is fine and dry with occasional summer frost. Coal for fuel is obtainable along the banks of Red Deer river. There are no stone quarries and no economic minerals were observed. No game was seen in this township.—*C. C. Fairchild, D.L.S., 1907.*

65. There is a good trail from Athabaska Landing to the township and the settlers have opened trails to reach mostly any point of the township. The soil is chiefly of black loam underlain by a clay subsoil and is suitable for mixed farming. About sixty percent of this township is wooded and about forty per cent is scrub or growing poplar distributed all over the township, but no timber of any value is found. There is about one hundred tons of hay along Pine creek. This creek is about twenty feet wide, one foot deep and gives an ample supply of fresh water. There is no water-power and none can be developed. There is no indication of summer frost and the climate is good. Wood as fuel can be obtained on every section but no lignite veins were observed. There are no stone quarries and no minerals of economic value. There is very little game.—*J. L. Côté, D.L.S., 1907.*

67. (*East outline*).—Along this line about forty per cent is a sandy or stony soil while the balance is divided between lakes, muskegs and swamps.—*J. L. Côté, D.L.S., 1907.*

68. (*East outline*).—Athabaska river flows in a northeasterly direction and crosses the line on section 25. The valley is about three hundred feet deep with a comparatively easy incline. The soil along sections 36, 25 and 24 may be classified as second class but along sections 13, 12 and 1 it is generally spruce swamp with some ridges.—*J. L. Côté, D.L.S., 1907.*

Range 22

10 & 11. (*Third correction line*).—The best route for reaching this portion of these townships is by following the road along the correction line, from Leavings, a station in range 26, on the Calgary and Edmonton branch of the Canadian Pacific railway. At the time of my visit (November) this road was in excellent condition. The soil is either clay or sandy loam and is apparently well adapted for farming as proved by the heavy growth of grass and the excellent crops of grain grown in the vicinity. The surface is rolling prairie with one small coulée cutting the eastern boundary. There is neither timber nor brush in these townships. A large pond of water held by a dam, evidently for watering stock, was noticed in the eastern portion of township

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Range 22—Continued.

10, range 22, but wells ranging in depth from fifteen to forty feet are the source of water supply. There are no water-powers. Hay may be cut in many places, as the natural growth in this locality is very luxuriant. The climate is equable and is not subject to summer frosts, but violent winds prevail throughout the entire district. Coal is the fuel most readily available and may be procured at any of the mines in the vicinity of Lethbridge. What appears to be shale, that was probably contiguous to coal was observed where a well was being dug in section 7 township 11, range 22, and I was credibly informed that farther north croppings of lignite were found, and that some coal had been taken out by the settlers. There were neither stone quarries, nor minerals of economic value found in these townships. Coyotes, foxes and badgers were the only game noticed.—*A. H. Hawkins, D.L.S., 1906.*

24. The township is all bare prairie, varying from undulating to rolling. The soil is clay loam with a subsoil of stiff grey clay, mixed with a slight amount of gravel. In some places the banks of the stream average about fifty feet in height and are rather steep. Herbage generally is first class except about one-tenth of the township which is exposed subsoil.—*Wm. Pearce, D.L.S., 1907.*

66. Athabaska Landing is located in this township on the south bank of Athabaska river. The provincial government has opened a trail to Lesser Slave lake which crosses on sections 21, 28, 29, and 30, and is in good condition. The soil is very light or swampy and there are only patches of fair land suitable for mixed farming. Fires have burned most of the wood leaving windfall and a few scattered green trees. There is no timber but there is an ample supply of fresh water. No water-powers occur. The climate is good with no summer frosts. Fuel can be obtained in every section but no stone quarries nor minerals of any economic value are found. There is very little game.—*J. L. Côté, D.L.S., 1907.*

67. (*East outline*).—The country along this line is rather swampy or low. A lake about two miles long and one mile wide touches the line at section 25. There are very fair patches of land.—*J. L. Côté, D.L.S., 1907.*

68. (*East outline*).—Athabaska river crosses the line in a northeasterly direction on section 12, in a deep ravine. The surface is generally undulating and the soil is fairly good.—*J. L. Côté, D.L.S., 1907.*

Range 23.

60. This township is reached from the Athabaska Landing trail but there is no trail into the township farther than to the northwest corner. The soil is mostly light and stony, and fit only for grazing or farming on a small scale. The northwesterly half is rolling and covered with a thick growth of small poplar and willow with a few small swamps of green spruce to the south, also considerable windfall. There are small lakes of fresh water in sections 18, 19, 30, 31 and 8, but they are all surrounded by muskeg. The southeasterly portion of the township is more level and swampy and is covered with scrub and timber. The most timber is on sections 35 and 36 consisting of poplar and spruce six to eighteen inches in diameter. There is no hay in this township except in small sloughs scattered over it but these are more numerous in the southeasterly half. The water is fresh but when the timber is gone it will be scarce as there are very few streams at present. There is no water-power. Wood for fuel is plentiful at present on almost every section. There are no stone quarries and no minerals of economic value. No small game was seen, but tracks of bear and moose were numerous.—*Hugh McGrandle, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 23—Continued.

67. (*East outline*).—Sections 36 and 25, 24 and 13 are very fair undulating land but the balance is fourth class.

68. (*East outline*).—Sections 36, 25 and 24, are in a tamarack swamp while sections 13, 12 and 1 are in good rolling second class soil.—*J. L. Côté, D.L.S., 1907.*

Range 24.

10. (*Third correction line*).—The best route for reaching this portion of the township is by following the road along this correction line from Leavings, a station on the Calgary and Edmonton branch of the Canadian Pacific railway in range 26. This road at the time of my visit (November) was in excellent condition. The soil is either a clay or sandy loam and is apparently well adapted for farming, as the heavy growth of grass and the excellent crops of grain grown testify. The surface is rolling prairie traversed by Rocky coulée through its western portion. There is neither timber nor brush in that portion of the township which we travelled. There are several springs along Rocky coulée which furnish water to the cattle in this locality, but the water is rather brackish, evidently being strongly charged with mineral salts. The settlers however all have wells ranging in depth from fifteen feet to two hundred feet, which appear to furnish sufficient water. There is no hay in the township nor were any water-powers observed. The climate is equable and so far as I heard is not subject to summer frosts, but frequent and violent winds prevail throughout this district. Coal is the fuel most readily available and may be procured generally at one of the mines in the vicinity of Lethbridge or at Leavings. A short tunnel has been driven in Rocky coulée in section 31, evidently prospecting for coal, and the material removed has the appearance of being in close proximity to coal, and I have no doubt but that further developments would reveal a coal bed at no great depth. Wood in small quantities, chiefly willow and cottonwood, can be obtained on Oldman river. There is considerable sandstone in Rocky coulée which would not be difficult to quarry, and would I think make fair building material. No minerals of economic value were found in this township. The only game noticed was a few coyotes and badgers. This township is fairly well settled, at least along the correction line, and the settlers appear to be prospering.—*A. H. Hawkins, D.L.S., 1906.*

13. This township is reached by a good trail from Claresholm, a flourishing town on the Calgary and Edmonton extension of the Canadian Pacific railway. The old Blackfoot trail passes through the township, but much of it has been fenced across by the settlers. The soil of the township is a deep sandy loam along Little Bow river, but it becomes heavier at some distance back from the river. The surface is rolling prairie entirely devoid of woods or scrub of any description. Hay of good quality can be cut all over the township, although the grass along the river is quite short owing no doubt to the sandy nature of the soil. The northern portion has a permanent supply of good water in the Little Bow. Little or no water-power is available. The climate is that of southern Alberta, generally, with but little danger of summer frosts. Good crops are grown throughout the township. Coal is the fuel used by the settlers and can be obtained from a mine worked within reasonable distance of the township. Outcroppings of stone were noted along the river, but no quarries are in operation. No minerals of economic value were seen. Game is very scarce.—*W. T. Green, D.L.S., 1907.*

65. (*North outline*).—On this line there is no green timber with the exception of a small swamp in the north of section 34. The soil is light and third class. The

TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 24—Continued.

land is rolling and covered with fallen timber and small scrub. On the north boundary of section 34 there is a high hill, from the top of which can be seen nearly the whole of townships 67 and 68, range 24, and for a long distance to the south and west.—*Hugh McGrandle, D.L.S., 1907.*

66. This township is reached by wagon trail from Athabaska Landing to Baptiste lake and around the north and west sides of the lake, but it is very rough from the landing to the lake. The soil in this township is very light and stony and is fit only for grazing or small farming. There are a number of half-breeds living on the north and west sides of Baptiste lake, but they cultivate only small potatoe patches. The surface of the township is very rolling and is covered with fallen timber, poplar and willow scrub. A high range of hills runs from section 3 to the south end of Baptiste lake on the east side of which are a few swamps with green spruce and tamarack and a few clumps of green timber along the lake shore; this is about all the green timber in the township. The only hay seen in this township was on sections 31 and 32. The half-breeds cut most of their hay for winter use in township 66, range 25. The water is fresh and sufficient. Baptiste lake extends to near the centre of the township, and numerous small creeks flow thereto from the west, south and east. Wood for fuel can be had on nearly every section. No coal or lignite veins were seen in the township. No stone quarries and no minerals of economic value were found. No game was seen but ducks. Baptiste lake is teeming with jackfish.—*Hugh McGrandle, D.L.S., 1907.*

67. This township is reached by wagon trail from Athabaska Landing which enters at the southeast corner and passes through sections 1, 11, 15, 22, 27, and 34. The road is very rough and in much need of repair from the landing to Baptiste lake. The soil in this township is rather light but suitable for mixed farming or grazing especially sections 12, 13, 14, 15, 22, 23, 24, 26, 27, and 34, where the soil consists of four to six inches of black loam over a sandy clay subsoil. The surface of this township is rolling, the east half is scrubby with patches of prairie and clumps of poplar and a few small swamps with green spruce. The west half is mostly timbered, especially sections 6, 7, 18, 19, 30, 31, 32 and 29, the timber consisting of poplar, spruce, birch and some jackpine; there are only scattered trees sufficiently large for making lumber. The east half of section 18 is mostly all birch and poplar from four to six inches in diameter. There are no large hay meadows in the township but there is some slough hay along the creek in section 16 and along the outlet of Baptiste lake, and patches of upland grass through the eastern part of the township. The water in this township is fresh and sufficient consisting of Baptiste lake in the southeast corner, lake No. 1, in the northeast corner, several small ponds scattered over the township and creek running diagonally across from section 31 into Baptiste lake in section 10. There is no land liable to be flooded except two or three acres at the east end of the bays of Baptiste lake in section 1. There are no water-powers in this township. There is plenty of wood for fuel on almost every section. There are no stone quarries, and no minerals of economic value are found. Small game is very scarce, a few partridges and ducks were seen, and plenty of jackfish are found in Baptiste lake and Lake No. 1. Sections 20, 21, 28, 29, 32, and the east halves of 30 and 31 are mostly all burnt swamp with islands of jackpine.—*Hugh McGrandle, D.L.S., 1907.*

68. This township is reached by wagon trail from Athabaska Landing which passes almost through the centre of the township from south to north, entering at the southeast corner of section 3 and leaving at the northeast corner of section 32. From

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 24—Continued.

Athabaska Landing to Baptiste lake the trail is very rough and in wet seasons, muddy and generally in great need of repairs. From Baptiste lake north the trail follows a sandy ridge which in places has the appearance of a railroad embankment. The soil varies from a sandy loam to clay, with considerable surface stones in places especially in the eastern portion of the township; it is suitable for grazing or farming on a small scale. The surface is rolling and hilly and covered with poplar and willow scrub with clumps of green poplar over the central portion of the township. Sections 6, 7, 17, 18, 19, 30, 13, 24, 25, 35 and 36 are almost all covered with green timber consisting of poplar, spruce and jackpine from eight to ten inches in diameter. Some spruce will go as high as eighteen to twenty inches in diameter but not in sufficient quantities for lumbering purposes. The only hay in the township is along the creek on the east half of section 3 and a few small patches of high land grass on the southwest quarter of section 2. The water is fresh and sufficient. There are four fair-sized lakes, one in each corner of the township, but there are very few running streams. A creek twenty links wide and one foot deep runs out of the south end of lake No. 2 in an easterly direction over a stony bottom leaving the township on the east boundary of section 24 thence in a northerly direction entering the township again at the northeast corner of section 25, and leaving at the northeast corner of the southeast quarter of section 36. There is considerable hay along this creek in range 23. A creek flows from the southeast end of lake No. 3 in a northeasterly direction across the southeast corner of section 27 and through section 26 entering lake No. 2 in the southeast corner of section 26. This creek flows through a deep ravine over stones but contained very little water at time of survey (September). There are no water-powers in this township. No coal or lignite veins were seen. No stone quarries or minerals of economic value were found. There is no small game except a few ducks but tracks of moose were plentiful and we noticed a spot near lake No. 2 where three had evidently been killed. There are plenty of jackfish of good size in lakes Nos. 1, 2, 3 and 4 in this township.—*Hugh McGrandle, D.L.S., 1907.*

Range 25.

65. (*East outline*).—The soil along this line is light and stony, only suitable for small farming or grazing, classed 3 and 4. The surface is rolling and scrubby and covered with fallen timber; there are numerous small swamps of green spruce but no timber of commercial value. There is a crooked lake in section 1 from five to ten chains from the line and extending the whole length of the section. There is another lake in section 7, township 65, range 24, touching the line at 25 chains and extending toward the northeast. No fish were seen in these lakes.—*Hugh McGrandle, D.L.S., 1907.*

Range 29.

10. Two main trails lead into this township, one from Macleod by way of Five-mile creek and the other from Leavings. These trails were in good condition until settlers, who have been coming into this and the adjoining townships in large numbers in the last year or so, fenced their quarter sections and changed the trails to the proper road allowances. Many of the roads were graded and bridges built during the summer, however, and the trails will soon be in good condition again. Porcupine hills, an extremely high and very rough range, extends diagonally through this township. The northeasterly part is open rolling prairie, while the hills are timbered with some fine fir, very straight and high. This timber is not very extensive and is being rapidly depleted by settlers. The prairie sections and the valleys between the hills afford

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TOWNSHIPS WEST OF THE FOURTH MERIDIAN.

Range 29—Continued.

considerable hay. Fine streams of good fresh water are numerous. Many of them have their sources in the hills in the township and could be easily utilized for irrigation in dry seasons. None of the streams are large enough to generate water-power. Some light frosts were noticed in the early summer but despite the late spring the grass was abundant by the middle of May and the crops sown seemed to grow very fast. The timber on the hills affords fuel for the settlers and if carefully preserved will continue to do so for several years. There were no stone quarries in the township but plenty of limestone is available. No minerals of economic value were seen. Some deer and partridge were seen among the hills.—*C. C. Smith, D.L.S., 1907.*

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 1.

13. This township is reached by a fair trail from Claresholm, a flourishing town on the Calgary and Edmonton extension of the Canadian Pacific railway and distant about thirty-five miles. This trail has been surveyed from Claresholm to Lyndon postoffice and is good in dry weather. From Lyndon to Lyndon mill a trail has been graded by the Lyndon Lumber company. This portion is almost impassable in wet weather but is very fair in a dry season. Lyndon mill is situated in section 11, of township 13, range 30 west of the fourth meridian. When running at full capacity it has an output of 12,000 feet of lumber per day, and supplies lumber to the settlers for miles around. Some good spruce and jackpine is found on section 1, township 13, range 1 west of the fifth meridian, and on section 2 township 13 range 30 west of the fourth, and from these two sections the lumber company have taken nearly all their logs. North of Lyndon creek the township is more or less open, and hay can be cut in fair quantities. The surface is very broken and hilly and is suitable for ranching only. Water of the finest quality is plentiful and permanent in Lyndon creek and its many tributaries, small spring creeks being numerous. Wood can be had in the south portion of the township both for fuel and building purposes. No minerals of economic value were noted. Game seems to be very scarce.—*W. T. Green, D.L.S., 1907.*

14. This township can be reached by a fair trail from Nanton which, however, traverses a high hill in the northeast corner of the township making the transport of heavy loads very difficult. In a very dry season or in winter this hill can be avoided by following a trail around the foot of the hill on the west side. In an average summer, however, the trail is impassable. The township is distant from Nanton about twenty-five miles. Nanton is a flourishing town on the Calgary and Edmonton extension of the Canadian Pacific railway. Five years ago, I believe there was only a station while now it is a thriving centre with a population of about 700. The soil is generally a black loam over clay and were it not for the danger of summer frosts, much of it would be excellently suited for agriculture. Willows postoffice situated in section 12 on Willow creek seems to be the point demarkation. Below there crops generally will mature but above that point on Willow creek only very occasionally will anything ripen. The township is essentially a ranchers' paradise. Grass grows luxuriantly and hay of excellent quality can be cut on much of the open land north of Willow creek. South of Willow creek, the country is hilly and covered with willow scrub and poplar. Spruce of fair quality is to be found on sections 12 and 13 of township 14, range 2. North of Willow creek the country is hilly but generally open. Water is both abundant and permanent. Willow creek, the south branch of Willow

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 1—Continued.

creek and the many creeks and springs flowing into these provide an excellent quality of water. No water-power is available. Fuel is amply provided for in the bush south of Willow creek. No coal or lignite veins were noticed. Outcroppings of rock were seen in several places along Willow creek but no quarries are in operation. No minerals of economic value were found. An excellent variety of trout is abundant in Willow creek. Two deer were seen in the southwestern portions of the township during the progress of the survey. Coyotes are numerous and some grouse were noticed. Timber wolves are occasionally a source of loss and annoyance to ranchers in the southern part of the township. There are also a few lynx, bob-cats and marten. *W. T. Green, D.L.S., 1907.*

Range 2.

10. This township may be reached by a good wagon road from Cowley. Though most of the township is hilly prairie much of it is very excellent farming and grazing land. Sections 6 and 7 are partly timbered with fir, spruce and poplar sufficiently large for building purposes. In the settled part of the township splendid crops and good herds of cattle and horses were seen. Hay can be cut in all the valley and on the hillsides. The north fork of Oldman river with its numerous tributary creeks afford a permanent supply of good water. The north fork could be utilized to develop extensive water-power. No summer frosts were noticed. Besides the wood referred to above there is an abundant supply of good bituminous coal for fuel. Though there appeared to be some limestone, no quarries were in operation. Game consists of partridge, chickens, coyotes and fox, and the river and creeks afford plenty of trout for the 'patient angler.'—*C. C. Smith, D.L.S., 1907.*

11. A good wagon road runs from Cowley to and partly through this township. It is necessary to ford the north fork of Oldman river, however, and even to one familiar with the fords this is a difficult and dangerous task. Generally speaking the surface of the township is very hilly prairie. Several creeks run in a southerly direction into the north fork through deep valleys or rather coulées, and high, rough watersheds divide the basins of the creeks. Bluffs of poplar and some fir and spruce were seen in sections 5 and 6. The valleys of the creeks have a good deep clay or sandy loam, but the hills are very stony and have a light soil. The township is excellently adapted to grazing and can be profitably farmed. Good hay can be cut in any of the valleys or on the lower hillsides. Besides the numerous creeks mentioned above there are very many springs affording a permanent supply of good water. There are no bad floods, as there is very little level bottom land in the valleys. None of the creeks except Callum and Coal creeks appear to be useful for water-power, though they all could be easily and profitably used for irrigation purposes. No summer frosts were seen. There is considerable limestone but no quarries have so far been opened. No minerals were seen. There were a few chicken and partridge in the bluffs, and the creeks afford a good supply of speckled trout.—*C. C. Smith, D.L.S., 1907.*

Range 3.

11. The wagon road from Co ley runs along the southerly side of the north fork of Oldman river through the Gap in the Livingstone mountains and then crossing Racehorse creek it enters this township in section 5. This road is travelled considerably and is in fairly good condition for a mountain road. A pack trail also runs along the northerly side of the river. Much of the township is very rough and mountainous, though along all the creeks there is good land which is being taken

WILLIAM WINT OF THE FIFTH DISTRICT

The mountains are very high and rugged. The township, at least, is of good size. There are many springs. There is a narrow river. A good operation. A good bank of the river. The climate was

...a flourishing town
...the railway and distant
...Marville, which is
...of Sheep river.
...Sheep river. The sur-
...and timber except along
...there are some excellent
...portion, well adapted for
...spruce and jackpine is
...Plenty of wood both for
...An ample and per-
...and Ware creek and their
...developed. The climate is
...the summer with frequent
...but no stone quarries
...Game is not plentiful
...Fish are plentiful both in

... a good trail, from Okotoks, a
... and Edmonton branch of the
... Merville on section 12, town-
... leads to the sawmill on sec-
... black loam, varying in depth
... and frequently, on the hill-tops,
... only, as I do not think
... early vegetables. The surface
... the creek bottoms, but they are
... swampy. There is but a
... and here only on the southerly
... still standing, such as spruce
... as thirty inches in diameter.
... 25, 28, 29, 31, 32 and 33. The
... 32 and 33. I met several parties
... on Fisher creek. A sawmill
... section 25 which may be reached
... on section 25 has already

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 4—Continued.

been removed, several million feet of lumber having been cut. There was also at one time, a sawmill on the northwest quarter of section 10, but it has since been removed. At a low estimate there is still available about five million feet of lumber. Owing to want of good roads and the numerous muskegs most of the lumbering operations would have to be carried on in winter. I succeeded in moving my wagons as far as the southeast quarter of section 30, by following the valley of Fisher creek, but that was owing to the swamps being frozen. With snow on the ground good roads could be made along the creek, but the bulk of the logs in the northerly part of this township will have to be moved down the valley of Whisky creek, thence to the south fork of Fisher creek. There are no hay meadows, but hay has apparently been made along the creek in section 29, where remains of old hay corrals were found. I also came across the remains of an old shack on the south side of the creek on the southeast quarter of section 30, said to have been the site of an old illicit still. This township is well watered, both by creeks and springs. The north branch of Sheep river cuts diagonally across the south half of section 6 and part of section 5. It must be quite a formidable stream at high water. It supplies water to the irrigation ditches on some of the northwesterly sections in township 20. A good-sized stream, Fisher creek, traverses sections 30, 29, 20, 21, 16, 10, 11 and 12. Whisky creek touches the northerly part of section 32. Numerous springs add to the volume of these creeks. The water is of good quality and the springs appear to be permanent. There are no water-powers in this township, and any attempt at damming Fisher creek might require to be done in the next township west. With reference to the climate, I think the indications are that no cereals can be ripened here, owing to prevailing summer frosts. I crossed the ice, on standing water, with my outfit early in November. A rancher to the south sows both oats and wheat for green feed, which is excellent for cattle where the supply of hay is limited. Fuel is plentiful in both green and fire-killed timber, such as poplar, spruce and jackpine. There are no stone quarries, no minerals of any economic value, nor were there any indications of coal. Game is still in evidence. Grouse, partridge and rabbits were seen, also signs of deer, which very probably will soon be exterminated by the Indians and white men, who hunt here in the fall. An Indian pack trail traverses this township southerly from Morley, on the Stony Indian reserve. It is much travelled by bands of Stony Indians, and leads to the Walrond ranch, and also to the trail crossing Livingstone range into the valley of Livingstone river. The southerly half of this township has been overrun by horses and cattle, resulting in the pasture being very bare at the time of my survey. There are but two settlers, both in the southeast corner. The only farming, however, that they have attempted is sowing oats for green feed for their cattle. Another settler, the proprietor of the sawmill on section 25, has also quite a number of cattle, but here the grazing area is very limited. Many settlers from the open prairie, miles to the east, came in here by way of the graded sawmill trail, for their fencing and building material. There are no good trails within the interior. Fisher creek has to be crossed a number of times in going up its valley, and approaches have to be constructed for crossing. Also, owing to the springy nature of the side hills many of the bottom lands are wet and boggy. This township is not at all suitable for general farming and only to a limited extent for cattle-raising. At some future time, when land becomes of greater value, and when the valuable part of the timber has been removed and the inferior part consumed by fire, then, by judicious draining and irrigation, most of the bottom lands in this township that are at present swampy, may become valuable for grazing and dairying purposes.—*C. F. Miles, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 4—Continued.

22. This township can be reached by a good trail from Calgary as far as Priddis. From Priddis the trail is only fair. In section 25 of township 22, range 4 the road divides, one leading northwesterly through sections 25 and 35 and thence on through the Sarcee Indian reserve, the other running southwesterly along the south branch of Fish creek to section 18. The latter would be almost impassible until late in the fall. The soil is generally a rich black loam over clay, although stone is frequently found on the hill tops. If it were not for the danger of summer frosts, the valley would be excellently fitted for agriculture. The surface is generally roughly rolling, the southerly and westerly portions becoming quite hilly. Almost the entire township is wooded, much of the northern part being covered with standing fire-killed poplar and jackpine. In the south some fair timber is found. The valleys are generally open. Hay can be cut on most of the valleys, although some are too swampy to make that possible. Water is abundant and permanent. The two branches of Fish creek, with the innumerable spring creeks scattered over the township, provide an excellent quality of water. No water-power could be developed. Summer frosts are general, though I believe there are some years when oats and barley will mature. No stone quarries were noted nor any minerals of economic value. Fuel is abundantly provided for in the fire-killed timber throughout the township. Game seems scarce, partridge and coyote being all that were seen. Deer are to be found, I believe; also an occasional bear in the western portion. A small variety of trout was found to be quite plentiful in the two branches of Fish creek.—*W. T. Green, D.L.S., 1907.*

44. The best route for reaching this township is through Bluff Centre, from either Ponoka or Lacombe. A wagon trail enters the township in section 12, and another, branching from the Bluff Centre-to-Buck Lake trail enters it in section 36. The soil is in parts suitable for agricultural purposes, but the township is largely composed of spruce muskegs, sloughs and jackpine ridges. Some patches of timber both dry and green suitable for settlers' purposes are found especially in the valley of the west branch of Blindman river. There are no large hay meadows, but grass suitable for pasturing is found in the majority of sections. Water is generally of a pure quality, the numerous small creeks and springs and the branch of Blindman river forming a sufficient and permanent supply for future settlers. The west branch of Blindman river enters this township on the north boundary of section 33 and leaves it in section 13, flowing in a southeasterly direction; its average width is about seven feet and its depth three feet with banks from twenty to thirty feet. There does not seem to be sufficient fall in this branch of Blindman river for the development of a serviceable water-power. The climate is similar to that of Edmonton. There is plenty of dry and green timber for fuel but no traces of coal, stones or minerals of any economic importance were found. There are some moose in this part of the country and a few bear, deer, rabbits, prairie chicken and some partridge.—*H. L. Seymour, D.L.S., 1907.*

47. This township is best reached by wagon trail from Wetaskiwin, entering section 1 and being well travelled on account of the lumbering carried on in this township. In section 10 this trail branches, one branch leading westward to the northeast end of Buck lake, another northward along Modeste creek and a third leads southward up the same creek. With the exception of the southwesterly part, which though quite heavily timbered with spruce, poplar, birch and balsam, is rough and uneven. The southerly part of the township is composed of timber berths numbered 1160, 1211 and 1353, being covered with spruce up to thirty inches in diameter and good sized poplar. There is but very little open country in the remainder

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 4—Continued.

of the township, for where not thickly timbered with spruce, poplar and some birch or jackpine it is covered with brulé, windfall and willow underbrush. It is quite rough along Modeste creek and its small tributaries. No hay meadows of any size exist in this heavily timbered township. Modeste creek flows northerly through the centre of the township and is from thirty to fifty feet wide, three feet deep with banks twenty-five feet high. A creek locally known as the 'Little Poplar,' when entering the township in section 24 is but ten feet wide but before it joins Modeste creek (locally known as Poplar river) in section 26, it becomes nearly as wide and might be mistaken for the main stream. A number of smaller tributaries containing excellent water are found in other parts of the township. There seems to be no possibility of developing any serviceable water-power on either of the two before mentioned streams. The climate is similar to that at Edmonton. There is plenty of dry and green timber for fuel, but no traces of coal were found. No stones or minerals of any economic importance were discovered. With the exception of mink, found along Modeste creek and its main tributary and a few weasels, there is very little game in this township.—*H. L. Seymour, D.L.S., 1907.*

Range 5.

48. This township is reached from township 49, range 5, by a wagon trail which leads across the northeast corner of the township along Modeste creek, this trail being fairly well travelled but hilly. An old pack trail leads from Modeste creek in section 26 southwards to Buck lake. The northerly and northeasterly portions of this township would be most easily cleared of the brulé and brush covering the rolling country, and the soil is good for agricultural purposes, the greater part of the township, however, while fairly level, is thickly wooded with spruce and poplar, especially sections 18 and 19 where some spruce to twenty-four inches is found, also tamarack and poplar of good size and quality. In section 26 a hay meadow over fifty acres produces good grass and peavine. No other large hay meadows were found, however. Except in the middle of the township a number of small creeks of good water were found and a creek fourteen to sixteen feet wide, two to three feet deep, with banks from forty to one hundred feet wide, enters this township from the south in section 3, is joined by another creek four feet wide in section 11, and flows into Modeste creek in section 13 or 24. A description of Modeste creek, which flows across the northeast corner of the township, was given in the report on township 49, range 5. There is not sufficient fall in any of the above mentioned streams to develop serviceable water-power. The climate is similar to that of Edmonton. There is plenty of dry and green timber for fuel, but no traces of coal were found. Game, which is very scarce, consists of bear, deer, moose and lynx. Along Modeste creek mink tracks were noted.—*H. L. Seymour, D.L.S., 1907.*

49. The best route for reaching the township is by wagon trail from Edmonton, which crosses Saskatchewan river in section 13, township 50, and enters the township near the northeast corner of section 33. On account of the lumbering in this and the adjoining townships the trail is fairly well travelled, but from Saskatchewan river south it is quite hilly and rough. The southwesterly portion of the township through which Modeste creek flows is heavily timbered with spruce to twenty-four inches and some large poplar, two lumber camps having operated there this winter cutting timber on a permit. When cleared the soil would be good for agricultural purposes but the country is rough. The northeasterly portion of the township has generally good soil, the country being heavily rolling, covered with

TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 5—Continued.

poplar and willow scrub, brulé and patches of good spruce and poplar. The northwest quarter of section 8 and the southwest quarter of section 29 are two river flats of from thirty to forty acres, on which good hay has been cropped for the last two years. There are also other smaller hay meadows along Modeste and Buck lake creeks. In the east of the township there are a number of small streams of excellent water and in the west Modeste creek, from fifty to one hundred feet in width, and from two to three feet deep in the late summer. It has a good current in banks from fifty to one hundred feet high and flows into Buck lake creek in section 20, the latter creek differing only by a greater depth of water which in both streams is of good quality. There does not seem to be sufficient fall in either of the above mentioned streams to develop any serviceable water-power. The climate is similar to that at Edmonton. There is plenty of dry and green timber in this township for fuel but no traces of coal were found. Along the banks of Modeste creek, some friable sandstone of brownish colour was noted. There is practically no game in this township, a bear or deer track being rarely seen.—*H. L. Seymour, D.L.S., 1907.*

54. (North part).—A fairly good wagon road leaves the trail from Lake St. Ann to S. W. McDonald's farm, at a point about one-half mile east of Mr. McDonald's farm; then running north it continues through the township. The soil is not very good, consisting of three or four inches of black loam with a subsoil of clay or gravel. It can be rated as second class land and is suitable for mixed farming. The surface is generally rolling with heavy poplar and brush along the north boundary but being fairly open in the south. There is no timber of any value. There is very little hay, although there are small patches where some hay could be cut. The water is fresh and the supply is permanent and sufficient, being furnished by two small lakes and several small ponds. There is no land liable to be flooded. There is no means of furnishing water-power. The climate is excellent, being similar to that of Edmonton district. Wood for fuel may be obtained on every section, but no coal veins have been discovered. There are no stone quarries and no minerals of any economic value. There is very little game.—*A. Michaud, D.L.S., 1906.*

55. There is a fairly good wagon road which leaves the trail from Lake St. Ann to Donald McDonald's farm, at a point about half a mile east of McDonald's farm. This road runs north through the centre of townships 54, 55 and 56, range 5, ending in the northeast quarter of section 16, township 56, range 5. There is also a good road running from Lake St. Ann to McLeod river, which enters this township on the east boundary of section 1 and leaves it on the west boundary of section 18. The soil is fairly good consisting of 6 to 8 inches of black loam over a sand or clay subsoil and is suitable for mixed farming. The surface is rolling and is covered with brush and small poplar 3 to 8 inches in diameter. About 150 tons of hay could be put up around Little Island lake in sections 7 and 8 and small quantities of upland hay could be cut in several small prairies in the northeastern part of the township. There is no timber of any value, for lumber. The township is fairly well watered by five fair-sized fresh water lakes which are permanent. Of these Lessard lake in sections 26, 27, 34 and 35, and Little Island lake in sections 7 and 8 are the most important. There is no land liable to be flooded. The climate is excellent and is similar to that of the Edmonton district. Wood for fuel is obtainable on every section, but no coal veins have been discovered. There are no stone quarries and no minerals of any economic value. There is very little game, but there is good pike fishing in Lessard lake.—*A. Michaud, D.L.S., 1906.*

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 5—Continued.

56. There is a fairly good road which leaves the trail from Lake St. Ann to Donald McDonald's farm at a point about a half mile east of Mr. McDonald's farm. This road runs north following the centre line of townships 54, 55 and 56, range 5, and terminates in the northeast quarter of section 16 of this township. The soil is good, consisting of six to ten inches of black loam over a clay subsoil, and is suitable for mixed farming. The surface is undulating and is covered with brush and poplar three to eight inches in diameter. In the east half of section 5 and in the west half of section 4, there is some good spruce timber ten inches in diameter. There is very little hay. The water is fresh, but is not very plentiful, there being only one small permanent lake on the east boundary of section 26, but there are several small creeks containing fresh water with an average width of three to four feet and a depth of six to eighteen inches. There is no land liable to be flooded. There is no way of obtaining water-power. The climate is excellent, being similar to that of the Edmonton district. Wood for fuel is obtainable on every section. There are no stone quarries and no minerals of any economic value. There is very little game.—A. Michaud, D.L.S., 1906.

Range 6.

49. This township is reached from township 49, range 5, by a wagon trail which enters section 25 and follows up Buck lake creek to a lumber camp in township 48, range 6, leaving the township in section 3, also by a wagon trail across the northeast corner of the township which leads to Saskatchewan river in section 8, township 50, range 6. Both these trails have been well travelled but are hilly, especially the one to the south. The westerly two-thirds of the township is heavily timbered with spruce to twenty-four inches and some large poplar. The soil is good and the easterly third of the township might be easily cleared of the brulé, poplar and willow scrub, which cover the rather rough country. A few patches of hay meadow are found in the easterly part of the township and in section 31. Saskatchewan river with banks from one hundred to one hundred and seventy-five feet high and one quarter of a mile wide enters this township in the northwest corner. Buck lake creek, four feet deep, fifty to seventy-five feet wide with banks one hundred feet high enters the township in section 2, and leaves in section 24. Except in the middle of the township small creeks containing good water are found. There does not seem to be sufficient fall in Buck lake creek to develop serviceable water-power. The climate is similar to that of Edmonton. There is plenty of dry and green timber for fuel but no traces of coal were found. No stone or minerals of economic importance were found. Game is very scarce in this part of the country. Bears are probably most numerous and tracks of deer and moose were seen.—H. L. Seymour, D.L.S., 1907.

Range 7.

54. The shortest and best route whereby this township can be reached from a railway point is by a good wagon trail from Edmonton to Grey's store. This store is situated in section 28, township 53, range 6. Thence there was a trail for about two miles from there it was necessary to open a trail through the woods entering the township in section 24. This trail was opened out northwesterly to the north boundary of section 34. A good pack trail passes through sections 24 and 23 and westerly connecting Lake St. Ann with Jasper House. The surface of this township is gently rolling but is broken on the east by Pembina river valley and on the north by a couple of ravines about one hundred feet deep in which are good streams of water. The township is timbered throughout. On sections 25, 26, 35 and 36 the bush is not

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 7—Continued.

as thick as it is to the west of these sections. The timber consists of poplar ranging in size up to two feet in diameter and averaging ten to twelve inches. Along with this poplar in many places there is a thick growth of willow ranging in size up to five inches in diameter. The soil generally consists of three inches of black loam with a subsoil of hard stiff clay which would be very difficult to cultivate. In many places the clay was so hard that the mounders were compelled to use picks. The clearing of the bush in this township would cost about thirty-five dollars per acre. From this it can be seen that present settlement is not probable. There is abundance of good water of a permanent character. There is no hay. Wood fuel is abundant and there is probably an underlying stratum of coal about one hundred and fifty feet below the surface, for coal outcrops along Pembina river are frequently to be seen, the seams appearing to be from five to six feet thick. There are no water-powers, no stone quarries nor minerals of economic value. No game was seen in the township.—*R. H. Knight, D.L.S., 1906.*

55. The nearest and best route whereby this township can be reached from a railway point is by a good wagon trail from Edmonton to Gray's store which is situated in section 28, township 53, range 6. From Gray's store the trail continues westward for two miles, and from there it was necessary to open a trail through the woods, entering the township at the south east corner of section 3. This trail was opened to Pembina river in section 22. The surface of this township west of Pembina river is nearly level, except for a couple of ravines in sections 16 and 21 in which streams of good water flow. Sections 29, 30, 31 and 32 are composed chiefly of swamps. All that portion of the township lying to the east of Pembina river is broken and hilly, except sections 25 and 36, which are somewhat gently rolling. The soil throughout consists of about three inches black loam with a hard white clay subsoil, which is exceedingly difficult to cultivate. The whole of the township except a few swamps or muskegs is covered by a thick growth of poplar, averaging about ten inches in diameter. In many places the trees are twenty inches in diameter and are long and straight. To clear the land for agriculture the cost would be upwards of thirty-five dollars per acre. This will retard the settlement of the township. The only hay found is around Michaud lake in section 25. Pembina river which runs through the township enters in section 1 and passes through sections 1, 12, 11, 10, 14, 15, 23, 22, 27, 28 and 33. The water of the river is good. The cross section at time of survey (November) was about six hundred square feet having a velocity of about two miles per hour. At high water the cross section is fully ten times as great. There are no water-powers nor stone quarries. At many points along the river there are outcrops of apparently good sandstone, in some places forty feet thick. Underneath this sandstone is a layer of lignite coal, of a superior quality being equal to that found in the vicinity of Edmonton. The seam of coal seems to be about six feet thick and outcrops frequently along the river. Other minerals of economic value do not occur. There is no game.—*R. H. Knight, D.L.S., 1906.*

57. A good road runs from Lake St. Ann, crossing the lake at The Narrows, and enters this township at the southeast corner, thence it runs in a northwesterly direction across the township to McLeod river. In section 16 other short trails branch off from this main trail to the different farms in this neighbourhood. In the northwest quarter of section 3 this road is joined by a road cut by the Grand Trunk Pacific railway survey parties, which also enters the township in the southeast corner. The soil in the centre of this township, in the valley of Big and Little Paddle rivers, is first class, consisting of from ten to eighteen inches of black loam over a clay sub-

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 7—Continued.

soil, and is suitable for all kinds of farming. In the extreme north and south parts of the township the soil is not so good, the depth of black soil averaging from four to eight inches over gumbo or clay subsoil, but it would be considered second class land suitable for mixed farming. The valley of the two Paddle rivers, which run from west to east through the centre of the township, is level and is filled with willow brush and in some places with hay meadows. The two south rows of sections and the north one and one-half rows are rolling and timbered with heavy poplar five to ten inches in diameter. There is no timber suitable for lumbering purposes, but good building timber can be obtained in the north and south parts of the township. In sections 24 and 25 there is a large hay meadow which will produce about one hundred tons of hay, and in sections 28 and part of 21 there is another large hay meadow which will produce from two to three hundred tons. There are also small patches all over the centre of the township where hay may be cut. The township is well watered by the two Paddle rivers, which run through the centre of the township from west to east and which meet at the northeast corner of section 22, also by Pembina river, which runs through the extreme southeast corner of the township. Of these, Pembina river averages four chains wide, four feet deep and has a current of three miles an hour. Big Paddle river averages thirty feet wide, two feet deep and has a current of two miles an hour. Little Paddle river averages twenty feet wide, one foot deep and has a current of two miles an hour. There are no lakes and no land is liable to be flooded. There is no means of obtaining water-power. The climate is excellent and similar to that of the Edmonton district. Wood for fuel is obtainable on nearly all sections, but no coal has been found. There are no stone quarries, and no minerals of economic value. There is no game in this township.—*A. Michaud, D.L.S., 1906.*

Range 9.

54. This township was reached by crossing Chip lake on the ice, thence by pack horses to section 21. There is a trail known as 'Jack's trail' passing through the north part of this township. The soil is mostly clay and is suitable for farm purposes. The surface is gently rolling, covered with poplar and willow. In the southwest sections of this township and in those sections bordering on the lake there is a large tamarack muskeg, which might be suitable for farm purposes when drained. There are no meadows, but some hay is found along the lake. The water is fresh and consists of one large creek running southerly through the township. It crosses the north boundary of section 34 and flows into Lobstick river. It is about fifty links wide and from two to six feet deep. No water-power exists in the township. The climate was very cold at time of survey—May. Dry tamarack, spruce and poplar may be obtained in large quantities for fuel. No stone quarries nor minerals were found. Bears, wolves, ducks and geese were the only game seen.—*J. C. Baker, D.L.S., 1907.*

Range 10.

53. We reached the township by crossing Chip lake on the ice. It can also be reached by the Yellowhead pack trail which runs through the southern part of this township. The soil is principally clay, and when cleared of the heavy bush will be suitable for farming. This township is gently rolling and covered with a heavy growth of poplar, willow, jackpine, tamarack, spruce, birch and balsam. Some timber suitable for lumber can be found in the southern part of this township. No hay meadows were seen, but hay in quantity can be obtained along the shore of Chip

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 10—Continued.

lake. The water in this lake as well as in all the creeks in this township is fresh. The creeks are small and I think will be dry in summer time. The climate was cold at the time of survey.—April. Plenty of dry tamarack, jackpine, spruce and poplar can be obtained for fuel, but no coal was seen. No stone quarries nor minerals were observed. Bear, mink, lynx and plenty of duck and geese on Chip lake were the only game seen.—*J. C. Baker, D.L.S., 1907.*

54. This township was reached by crossing Chip lake on the ice. 'Jack's pack trail' passes through a part of this township, crossing the north boundary of section 34. The soil is mostly clay and is suitable for farming. The surface is gently rolling and covered with poplar, willow and spruce, but there is no timber of importance in this township. Hay is plentiful along the lake, but no hay meadows were seen. Fresh water is found in the lake. One large creek occurs in the western part of this township. It flows into Chip lake, crossing the north boundary of section 32. It is about fifty links wide and three to five feet deep. There is no water-power. The climate was cold at the time of survey.—April. Plenty of dry poplar and tamarack can be obtained for fuel, but no coal was seen. There are no minerals nor stone quarries. Bears, wolves, ducks and geese were the only game noticed.—*J. C. Baker, D.L.S., 1907.*

55 & 56. (*Outlines*).—We crossed Chip lake on the ice to section 28, township 54, range 10, and from there we used pack horses, following an old pack trail which runs due north crossing the north boundary near the northeast corner of section 32. The soil in township 56, range 10 along the meridian lines is well adapted for farming but in township 55 there is more muskeg and swamp. In township 56 the surface is rolling and covered with second growth poplar. In township 55 the surface is rolling but covered with large poplar, spruce and willow. No timber of value was seen along the meridian lines. The south branch of Paddle river crosses the east boundary of section 13. It contains fresh water, is about fifty links wide and from three to six feet deep. About three feet of snow was on the ground at the time of survey (March) while the weather was very cold. Plenty of dry tamarack, jackpine, spruce and poplar can be obtained for fuel. No stone quarries or minerals were found. No game of any kind was seen.—*J. C. Baker, D.L.S., 1907.*

Range 11.

53. I reached this township by the Jasper or Yellowhead pack trail, which passes through the southern part of the township. The trail was in very poor condition. The soil is black loam and clay, suitable for farm purposes. The surface is level and covered with poplar, spruce, tamarack and willow. There is spruce and tamarack suitable for timber in sections 1, 2, 3, 4, 9, 10 and 11. It is from eight to sixteen inches in diameter. No hay is found. There are several small creeks in this township, the water of which is fresh. The land is not liable to be flooded and no water-power occurs. The climate was cold and wet at time of survey (June) with no summer frosts. Fuel consists of plenty of dry spruce, tamarack and poplar, but no coal, stone quarries nor minerals are found. Game consists of moose, deer, bear, &c.—*J. C. Baker, D.L.S., 1907.*

54. I reached this township by making a pack trail along Lobstick river. The trail is very poor. This township is nearly all muskeg. If the land can be drained it will be suitable for farming. The surface is level and covered with small poplar, willow, swamp spruce and tamarack. There is no timber nor hay in this township.

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 11—Continued.

Lobstick river flows through this township, through sections 18, 17, 16, 9, 10 and 3. No water-power is found. The climate was warm at time of survey (September) with no summer frosts. Fuel consists of plenty of dry spruce, tamarack and poplar, but no coal, stone quarries nor minerals are found. Game is moose, deer, bear, &c.,—*J. C. Baker, D.L.S., 1907.*

Range 12.

53. I reached this township by the Jaspar or Yellowhead pack trail. This trail runs through the southern part of the township. The trail at the time of survey (July) was in very poor condition. This township is level and covered with a thick growth of poplar, spruce and willow. There is some large spruce but not in sufficient quantity for timber. When cleared, the soil, which is mostly black loam and clay, will be suitable for farm purposes. In section 6, near Lobstick river there is some hay land, but no other hay lands were seen. Lobstick river flows along the west boundary. The water is fresh. There is also a number of creeks, but no water-power. The climate was wet and cool at time of survey, with no frosts. Fuel consists of plenty of dry wood, but no coal was seen. There are no stone quarries nor minerals. Game consists of deer, moose, bear, wolves, &c.—*J. C. Baker, 1907.*

54. I reached this township by making my own pack trail along Lobstick river. The trail in many places was very bad. This township is nearly all muskeg and under water, not suitable for farming. It is level and covered with poplar, willow and swamp spruce and tamarack. There is no timber except a small amount along Lobstick river. This occurs in sections 19, 20 and 21. This timber is spruce and tamarack varying from ten to twenty-four inches in diameter. There are no hay lands. Lobstick river flows along the west boundary, north boundaries of sections 19, 20, 21 and east boundaries of 22, 14 and 13. It is about sixty feet wide and varies from two to ten feet deep. The water is fresh. There are no water-powers. The climate was warm at the time of survey (September) with no frosts. Fuel consists of plenty of dry poplar, spruce and tamarack, but no coal nor minerals were found. Game consists of moose, deer, bear, wolves, &c.—*J. C. Baker, D.L.S., 1907.*

Range 13.

52. The surface of this township is mainly rolling, or gently rolling and well wooded with spruce and jackpine, running from about five to ten inches in diameter. Intermingled with the spruce and jackpine in many places are scattered poplar, and there are also considerable areas wooded with aspen and balsam poplar from four to fourteen inches in diameter, and occasionally a few birch trees about five or six inches in diameter are met with. I was unable to properly explore the whole township, but apparently the greater portion of it is similar to the northerly part which is well fitted for settlement, being mostly high land, rolling enough for good drainage, and well watered with many small creeks, varying from one to four or five feet in width, and having a depth of one or two feet. These creeks generally flow with a good current, and their waters are fresh and soft.

Carrot creek flows through the northwestern part of the township in a valley about a quarter of a mile wide at the bottom, and three-quarters of a mile wide at the top; the bottom of the valley being depressed about fifty feet below the level of the surrounding country, and mainly consists of boggy hay land interspersed with clumps of willow brush.

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 13—Continued.

The soil in the higher portions of the township is principally clay, or clay loam with a light covering of black loam, though in the depressions, or swampy portions, the soil is black muck or peaty loam.

This township though mainly wooded throughout could be cleared without a great deal of difficulty and should prove a very desirable location for settlers. The soil is well adapted for the successful production of the various grains and vegetables usually grown in the province of Alberta. Very little of the timber in this township is suitable for being converted into lumber but timber for building houses, fuel and fencing can be obtained on any quarter section in it.—*Geo. Ross, D.L.S., 1907.*

53. I reached this township by the Yellowhead pack trail which passes through the southern part of the township. It was in very poor condition at time of survey (July). The soil in this township is fairly good being black loam and clay subsoil. It is suitable for farm purposes. The township is gently rolling, covered with small poplar and willow. There is no timber in this township. No hay meadows are found. Carrot creek flows along the western boundary of this township. It is about sixty feet wide and two to four feet deep. The water is fresh. The land is not liable to be flooded. It was fine summer weather with no frosts at the time of survey. Plenty of dry poplar can be found anywhere. No coal, stone quarries nor minerals were found. Moose, deer, bear, wolves and other small animals were seen.—*J. C. Baker, D.L.S., 1907.*

53. This township is rolling and consists of a succession of ridges from about fifteen to fifty feet high, with wide intervening valleys. The south boundary in general runs through a thick growth of live timber, spruce and jackpine, mixed with poplar and also tracts of aspen and balsam poplar, the trees varying from four to twelve inches in diameter. The Yellowhead pass pack trail traverses this township from east to west, keeping about three-quarters of a mile north of its south boundary. This trail in the eastern portion of the township passes through a spruce *brulé*, with some patches of live spruce averaging eight inches in diameter for about two miles, then west of this it passes through some very soft swampy ground with live spruce for about a mile and a half, then comes out on higher ground well wooded with poplar from six to twelve inches in diameter, then winds westerly through some comparatively open patches of rolling land with poplar and willow brush and a good growth of grass and past an occasional old beaver meadow. The south part of section 5 and the southwest part of section 4 is heavily wooded with poplar from four to fourteen inches in diameter, but the greater portion of the township is *brulé*, and comparatively open, the timbered area in general only reaching about half a mile north of the south boundary, and even in this there are strips of timber killed by fire. In going west from Lake St Ann, by the Yellowhead pass trail, our first view of the mountains was obtained from the top of a ridge, about midway between the east and west boundaries of this township. The soil is mainly light sandy loam, although clay soil with a light covering of black loam predominates in the wooded portion near the south boundary. The greater part of the township can be readily cleared, and would be well adapted for grain growing, gardening or mixed farming, and should be quite desirable as a location for settlers.—*Geo. Ross, D.L.S., 1907.*

54. I reached this township by an old Indian pack trail which follows along the east bank of Carrot creek. The trail was in very poor condition. The soil is nearly all muskeg, not suitable for farming. This township is level and covered with poplar, willow, tamarack and spruce. There is no timber, the tamarack and spruce found being small. No hay land is found. Carrot creek flows through the

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 13—Continued.

western part of this township. The water is fresh. No water-power occurs. The climate was warm at time of survey (August) with no frosts. Fuel consists of dry poplar, spruce and tamarack, but no coal was seen. There are no stone quarries nor minerals. Moose, deer, bear, wolves, &c., were seen.—*J. C. Baker, D.L.S., 1907.*

Range 14.

52. The northern portion of this township is mainly rolling land, generally high, and when cleared would be well adapted for cultivation. It is watered by several small creeks running northerly into a tributary of Carrot creek, which flows easterly through the southern portion of township 53, in this range. On section 36 there is a fine woods of aspen and balsam poplar, from which good logs, suitable for building timber or for being converted into lumber, can be obtained. In the northern parts of sections 32 and 33, in the valley of the creeks draining this part of the township, there is a considerable area of brulé with dead standing spruce, but the remainder of the township, except an occasional small area, is heavily timbered with poplar, spruce and jackpine suitable for the ordinary requirements of settlers. I did not explore the southern part of this township, but apparently all of it is fairly high and rolling land, not broken by true muskegs, although in the bottoms of some of the valleys or depressions the surface has become rather spongy owing to the excessive amount of moisture retained by the covering of moss. The soil is principally clay, under a shallow covering of black loam, but on the tops of ridges in many places the subsoil is gravelly, and in the depressions, or bottom of lower land between ridges the soil is black muck or peaty loam. As far as I can judge the whole of this township is well adapted to meet the ordinary requirements of settlers.—*Geo. Ross, D.L.S., 1907.*

53. The surface of this township is rolling, with the ridges or higher elevations of land running from about ten to seventy feet above the depressions, or lower intervening land. The Yellowhead pass trail traverses the township in an easterly and westerly direction, about a mile or a mile and a half north of the south boundary of the township. The southerly portion of sections 1 and 2 is well wooded with poplar and spruce, varying from about six to twenty-one inches in diameter. Between the Yellowhead pass trail and the south boundary of the township, a tributary of Carrot creek flows easterly in a valley of partially open land, on which there is a good growth of grass, but the soil is rather soft and spongy, owing to the soakage of water from the adjoining higher land, but when cleared and drained would form very desirable grazing grounds. North of this valley and south of the trail in the western half of the township there is a very fine wood of poplar and spruce, the trees being in general from four to fourteen inches in diameter. The wooded portion of the township lies mainly between its south boundary and the trail, but there are also some groves of fair sized poplar and jackpine to be found north of the trail, though the greater portion of the surface of the whole township is brulé, with a fairly good growth of grass. The township is well watered throughout by many small creeks, having a good supply of pure water, and along the courses of some of them old beaver meadows with good pasturage are occasionally found. The soil in the poplar woods is mainly clay, or clay loam, but in the greater portion of the township the soil is sandy loam. Taken as a whole, this township is quite well adapted for grain growing, gardening or mixed farming, and timber for the ordinary requirements of settlers can be readily obtained.—*Geo. Ross, D.L.S., 1907.*

54. I reached this township by following the Grand Trunk Pacific pack trail, which passes through section 12, 14, 15, 9, 8, 17 and 18. The soil consists of alter-

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 14—Continued.

nately muskeg and sand ridges, not suitable for farming. The surface is gently rolling and covered with small poplar, jackpine and willow on the ridges and spruce and tamarack on the muskegs. There is no timber in this township. No hay is found. There is one small creek flowing north through the centre of the township. The water is fresh. There is also a small lake in section 19, too small to traverse. No water-power occurs. The climate was clear and fine at time of survey (September) with frosts at night. Fuel consists of plenty of dry poplar, jackpine, tamarack and spruce, but no coal, stone quarries nor minerals are found. Game consists of moose, deer, bear, etc.—*J. C. Baker, D.L.S., 1907.*

73. The greater portion of this township will make excellent farms some time, but at present there are not prairie openings of sufficient area, to induce the settler to stop there now. There are numerous small spruce muskegs nearly dry, a large one at the southwest corner and another near the northeast corner. Both of these large muskegs are at present very soft and unsafe for pack trains to cross and the timber adjoining these muskegs is not large enough nor in large enough quantities to be of much value except possibly for settlers' uses. Large poplar is found in belts along the east boundary but it is decaying rapidly. A creek flowing through the westerly part of the township, crosses the north boundary in section 31. The average width is twenty-five feet and the depth of water three inches in the rapids. Very little current can be noticed except where the water is shallow. The banks rise from twenty-five to seventy-five feet high, and prairie spots are found occasionally along this creek. Another small stream leaves the township near the northeast corner. This flows northeasterly into the lake about a mile and one-quarter east of the east boundary of township 74, range 14. This small stream about four links wide and two inches deep contains good water and is said by the Indians to have its head in a small lake east of the wagon road and south of the large muskeg. Several other water courses were crossed which had water in pools within their banks but no running water. These came from the higher lands to the south and east of this township. The wagon road which crosses the base line in section 2 leaves the township in section 34 and is quite good as far as seen. It is used occasionally by people travelling light, but it would require much improvement for loaded wagons. No rock, coal, or game and very few sloughs or hay meadows were seen.—*Henry W. Selby, D.L.S., 1907.*

75. That part of the township north of Lesser Slave lake lies with a general descent towards the lake into which the greater part of it is drained. The settlement survey lying within its boundaries takes in nearly all the prairie but there has been a good deal of the timber suitable for sawlogs and much firewood cut for the uses of the settlement so that it would not be difficult to clear up many of the farms not embraced within the settlement survey. There are several hundred thousand feet of spruce which could be cut yet, and should a fire run over the slashed portion of the bush it would severely damage that now standing. A road has been cut about sixteen feet wide from the village southeasterly, which leaves the township in section 24 and intersects Slave lake about a mile east of the township. This road is used mainly by the freighters in the winter to avoid the dangerous ice around Shaw point. It is also used by people in the summer who are travelling with light loads. The soil generally is loam with a sandy clay subsoil and will make good farming land when once cleared. Shaw point and for some little distance inland is composed of coarse sand, gravel and stones partly covered by sand and leaf mould. At the time of low water there is a strip of land along the west side of the settlement survey which makes good pasture land especially those portions of it west of the main outlet of Buffalo Bay, but this is liable to be flooded at any time. There is a narrow strip of land a

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 14—Continued.

little over six chains wide lying to the west of Indian reserve No. 150 A which being thickly covered with brush is now considered too wet for farming, but when cleared it will make good farming or meadow land. There are two squatters, one on section 31 and the other on section 12 who have good houses but very little clearing, neither of them living there at the time of survey. Water found in the township is very good, one spring found near the southeast corner of section 27 has a strong mineral taste. If this was analyzed it might prove to be of commercial value. There are no hay lands except those mentioned along the west boundary and along the lake shore at low water. I did not see any coal or stone quarry on these lands and no game of any kind although moose were killed this spring three miles east of these lands.—*Henry W. Selby, D.L.S., 1907.*

Range 15.

52. This township contains some areas of good rolling high land with clay soil well adapted for grain growing, when cleared, but the greater portion of it is covered with spruce and tamarack swamps, the soil in which consists of a black muck or peaty loam. Many of these swamps if cleared would not retain so much moisture and would become drier. Many of them could be quite readily drained, and no doubt in time will become valuable agricultural land. On the northeast quarter of section 36 there is a fine poplar woods, the trees in which vary from about four to twelve inches in diameter, and on the west side of the north half of section 35 and east side of the north part of section 34, is a ridge rising between swamp lands on either side, which is well wooded with poplar, cotton-wood and spruce from six to twenty inches in diameter. These and a few similar tracts of high land are the most valuable portions of this township. Some of the timber on these tracts is suitable for lumber, but in general it would be mainly useful in building log houses, and in providing timber for fuel, fencing, &c. For the latter purposes, spruce and tamarack from the swamps is also available. The western and southwestern portion of this township is watered by Wolf creek, a fine stream of pure water, about eighty feet wide, and from two and a half to five feet in depth, flowing with a fairly rapid current. In section 31, it flows through a valley in which the bottom lands are prairie mixed with scrub and groves of poplar. The open land has a good growth of grass, peavine and vetch, and is well adapted for grazing. The banks of the valley of Wolf creek are about thirty or forty feet high and are generally sloping grassy banks, but in places they are steep cutbanks, and in one place in the north half of section 31, an eighteen-inch seam of coal is exposed. Intermingled with the spruce and tamarack swamps in this township are many ridges the surface of which is brulé, with willow and poplar brush, or a growth of young jackpine. On the ridges with light brulé there was a good growth of wild strawberry vines, bearing a fine crop of large strawberries of excellent flavour. The timber in the swamps is not generally larger than eight inches in diameter, and would average about five inches. The soil in the swamps is black muck or peaty loam, and on the ridges, generally it is light sandy loam. In the valley of Wolf creek the soil is a rich dark alluvium. Speaking generally this township cannot be classed as being well adapted for farming operations, on account of so much of its area being covered with spruce and tamarack swamps, though there are some good arable tracts, more particularly in the northeastern part.—*Geo. Ross, D.L.S., 1907.*

53. This township is composed mainly of a succession of ridges from fifteen to forty feet high, with intervening swamps, covered with spruce and tamarack from three to six inches in diameter. The Yellowhead pass trail runs westerly through

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 15—Continued.

the southerly portion of the township, except in the west half of section 5, and the east half of section 6, where it takes a southerly loop into the northerly part of township 52. Along the trail, there is a considerable amount of light brulé in which there is a good growth of grass, and interspersed are groves of young or medium-sized poplar, and also considerable areas of thick poplar and willow brush. In the southeast portion of section 1, there is a fine wood of poplar, averaging from four to twelve inches in diameter, and on a ridge which extends into the southeast part of section 3 and the southwest part of section 2 is another small area of good poplar timber. About midway between the east and west boundaries of the township and about a quarter of a mile north of the Yellowhead pass trail, there is a beautiful lake about a mile and a half long, and a mile wide, that is mostly surrounded by spruce about four or five inches in diameter. The banks of this lake are well defined though in many places they are not more than two or three feet high. Towards the southern part of the lake there is an island of about an acre in extent, elevated about eight or ten feet above the water and covered with a heavy growth of spruce and jackpine. In addition to Wolf creek which flows northerly through the southwesterly part of the township, it is well watered with numerous small creeks having a good supply of pure water. The soil on the ridges is mainly light sandy loam, well adapted for gardening, and fairly suitable for grain growing, but the township on the whole is rather broken by swamp to be of much value to settlers who wish to make a success of grain growing, unless a good deal of draining is first done. The timber found in general is only suitable for fuel and fencing.—*Geo. Ross, D.L.S., 1907.*

54. I reached this township by following the Grand Trunk Pacific pack trail. This trail passes through sections 24, 23, 22, 21, 20, 19 and 18 of this township. The trail is in good condition. The soil is black loam and clay. It is suitable for farm purposes. The surface is rolling and covered with small poplar, jackpine, willow and windfall. There is a small amount of timber in sections 11, 12, 2 and 1 of this township, consisting of tamarack and spruce, varying in size from ten to twenty-four inches in diameter. There is some hay land to be found in the flats along McLeod river, which flows along the north boundaries of sections 19, 20, 21, 22, 23 and 24. It is a fine stream five hundred feet wide and varies from one to ten feet in depth. At time of survey (October) it was shallow but usually it is very difficult to ford. McLeod river could be used for water-power by damming the stream. The climate was fine and clear at the time of survey, with frosts. Fuel consists of plenty of dry spruce, tamarack, poplar and jackpine, but no coal was seen. Sandstone might be obtained along the banks of McLeod river, but no minerals were seen. Game consists of moose, deer, bear, wolves, etc.—*J. C. Baker, D.L.S., 1907.*

73. Large muskegs are seen in various parts but these should not be permanently a detriment, as the township being high, these can be easily drained. The soil is three to ten inches of black loam on hard clay subsoil and produces rich vegetation. The timber generally is not of much value, most of the spruce and poplar being bad at the heart and easily broken off by the wind. Several small creeks or watercourses were crossed and the water was good, especially in one flowing easterly through section 25. The west branch of this rises in the westerly part of the township and although only a small stream three links wide and three inches deep it appears to be flowing quite steadily when it was crossed, while many others were quite dry.—*Henry W. Selby, D.L.S., 1907.*

74. This township is very well supplied with wagon roads, one passing through the northwesterly sections 18, 19, 30 and 32 from the Prairie River settlement to

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 15—Continued.

Lesser Slave Lake P.O. and the other from the same settlement to the lake at the mouth of Sucker creek, and passing through sections 18, 17, 16, 15, 14 and 13. These roads except at the time of wet weather are very good for present traffic. The soil is black loam from eight to eighteen inches on clay subsoil. The surface is undulating with a very gentle descent towards the northeast. A large spruce swamp occupies the greater part of sections 25 and 26 and extends into the Indian reserve. The timber in this swamp is generally small but around the outer edge a few spruce trees from twelve to sixteen inches in diameter are found. The poplar on the south tier of sections is from four to fourteen inches in diameter and with a few spruce and willow bunches fairly covers them through the remainder of the township. The poplar is in belts and bluffs with prairie openings and willow bunches. The greater part of sections 13, 14, 15, 16, 19, 20, 29, 30, 31 and 32 are prairie with poplar bluffs and bunches of willow along the watercourses. Some of these sections have been occupied for several years and the growth of grain, potatoes and hay is amazing. Several well defined watercourses are noticeable within the township, but only three appear to be permanent creeks. These were Travers creek, Bridge creek and the west branch of Sucker creek. The water in each of these is good though slightly alkaline; this of course is more noticeable later in the season. There is a slough which lies across sections 29, 28 and 27 in which the water is from four to eight feet deep and over a chain wide. It has the appearance of once having been a river channel which had been dammed by beaver in places and gradually filled up so that there is no inlet or outlet except at flood time. The dry channel is seen through the willows both east and west of that part which crosses sections 27, 28 and 29. Hay grows in abundance on all the prairie sections mentioned and in addition to these large hay meadows are found on sections 21, 22, 27, 28, 34 and 35, upon which grass grows luxuriantly but the ground is so rough and wet generally, that a good deal of work would be required before machinery could be used. No water-power of sufficient capacity could be developed on either of the small streams flowing through this township. Summer frosts occur nearly every month, but they do not injure the grain where the seed has been grown in the district. The fuel of this part of the country is poplar and willow. No coal seams have been found neither are there stone quarries nor minerals known to exist there. Outside of the prairie wolf, game is very scarce. This township is best adapted to mixed farming, the growth of coarse grain and stock raising being best suited to the condition existing. It is very possible that minerals will be found and a large population will require all kinds of produce in the adjacent hills to the south, as well as in the foothills of the Rocky mountains where large deposits of coal and other minerals have already been found. Settlement cannot advance very fast without better means of transportation to the markets, for the produce which can be grown in this beautiful country.—*Henry W. Selby, D.L.S., 1907.*

75. This township, according to the Indian legends, was once under the water of Lesser Slave lake, but through the process of time it has been built up by the deposit or sediment brought there by the rivers and creeks, all of which flow from the west and southwest draining the higher lands. The northeasterly ten sections are partly flooded at the time of high water but not for very long, since upon these sections large quantities of hay are annually put up for the use of the settlement. Sections 29, 30, 31 and 32 are at present too rough and hummocky and have too much willow and dead timber lying upon them to be of much use, although through it all there is a fine growth of hay which cannot be cut. The rest of the township is high enough to make good farms for mixed farming with a depth of fourteen to eighteen inches of black loam on a sandy clay subsoil. Many prairie spots are found through this

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 16—Continued.

portion and the bush is mainly willow with bluffs of poplar and spruce, but there is little timber of any commercial value, and will not be sufficient for the needs of the settler. What is a road enters the township in section 4 and running northeast 24. There are other wagon roads used by hay makers and others, but very little difficulty in opening roads in this township anywhere, many openings in the willow brush. Two small creeks run to the north in a northeasterly direction to the west arm of Lesser Slave lake line. The actual water running is probably not more than the inches deep but there are many places where the water level in the coulees in which these creeks run is three or four feet deep, hundred links in width. The banks of these coulees rise from the outlet, to about fifteen feet at the south boundary of the township. They were found on sections 7 and 18 at the time of survey and have begun breaking and building on sections 6 and 8. These sections are now diked and five acres in crop this year, and have large numbers of buildings besides the necessary buildings. The surface being so nearly level no stones or stone were found, and except duck and geese no game was seen. *D.L.S., 1907.*

77. The south one-third of this township is composed of gently rolling land at an elevation of about two hundred and fifty feet above Lesser Slave lake. It is conveniently situated for farming purposes, the Peace river road cutting across the southwest corner of sections 5 and 6. The richness of the soil is shown by the luxuriant growth of grass, peavine and vetch which grow in the open lands. The ridges are lightly covered with poplar and a few scattered spruce, and between the ridges bunches of willow, and a few willow sloughs. Most of these sections when cleared ought to make beautiful farms. Sections 5, 6 and 7 have had fires on them which has left parts of them almost cleared. A large muskeg lies to the north of these sections which occupies the northerly part of the township and from it several fine streams of water of good quality take their origin. No stone, rock or coal was found and no hay lands, as the timber grows quite evenly over these sections. There are a few spruce around section 10 which would make building timber or sawlogs. No game of any kind was seen. *—Henry W. Selby, D.L.S., 1907.*

Range 16.

52. This township is rolling or gently rolling land, the surface being a succession of low ridges with *brulé*, having a growth of poplar and willow brush, or young jackpine and intervening swamps with spruce and tamarack, from three to eight inches in diameter. In some of the lower or swampy portions of the township, *brulé* is also met with, and in some of the *brulé*s there is a good deal of windfall. Moose creek runs through the southwestern portion of the township and in its vicinity there is a considerable portion of fairly open land with clumps of medium sized spruce. This creek is a fine stream of good water, about twenty feet wide and from one to four feet deep. It flows on a stony bed in a valley about sixty feet deep, and half a mile wide, and along its banks a large amount of good sandstone is exposed. The soil in this township varies from clay to light sandy loam on the ridges, and in the swamps it is black muck or peaty loam, with a clay subsoil. Many of these swamps can no doubt be readily drained and will in time become desirable agricultural land, but at present, or in the near future, much of this township could not

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 16—Continued.

be classed as a desirable location for settlers. The soil on the ridges is in general suitable for growing small fruits or for gardening, and in the latter part of July and the first part of August, when the north boundary of the township was surveyed, a fine crop of ripe strawberries was found on all these ridges, where the brulé was light or comparatively open. The Yellowhead pass trail runs through this township near its northerly boundary, and takes an occasional loop into township 53, north of it.—*Geo. Ross, D.L.S., 1907.*

53. The southeastern part of this township is mainly swamp, with spruce and tamarack from three to six inches in diameter. This swamp is not in one continuous stretch, but is broken or divided up into smaller areas by low ridges, having a growth of jackpine or spruce about five inches in diameter, though in many places the ridges are covered with brulé having a small amount of windfall and a growth of poplar and willow brush. The southwest part of the township is principally light brulé or partly open land with patches of poplar and spruce. In the south halves of sections 5 and 6 there are some peculiar ridges about ten or fifteen feet high composed of drift sand. McLeod river runs through the northwestern part of the township, but I did not explore the land in its vicinity nor the northern part of the township. The greater portion of the southern half of this township is rather too swampy to make good agricultural lands, though there are some tracts of good second class land in it, with a clay subsoil under a shallow covering of black loam that when cleared would be suitable for grain growing.—*Geo. Ross, D.L.S., 1907.*

53. One can pass anywhere in this township with pack horses. The soil is mostly black loam and clay. It is suitable for farming. The surface is gently rolling except near the mouth of Wolf creek, where it is broken. It is covered with poplar, willow, small jackpine, spruce and tamarack, but there is no timber. Plenty of hay is found in the flats of McLeod river, which runs through the centre of this township. Wolf creek also passes through this township. It is a stream about one hundred feet wide and varying from two to six feet in depth. The water is fresh. Water-power could be developed either on Wolf creek or McLeod river by damming. The weather was fine at the time of survey (November) with frosts. There are plenty of dry poplar, spruce, tamarack and jackpine, but no coal was seen. Some sandstone was found along McLeod river, but no minerals were seen. Game consists of moose, bear, deer, wolves, &c.—*J. C. Baker, D.L.S., 1907.*

54. One can pass anywhere in this township with pack horses. The soil is mostly black loam and clay. It is suitable for farming. The surface is gently rolling and covered with small poplar and willow, but there is no timber. Plenty of hay can be obtained in the flats along McLeod river, which flows through this township. It is a fine stream, being about five hundred feet wide, containing fresh water and varying from one to ten feet at low water mark. Muskeg river also flows east, through this township and empties into the McLeod. It is a small stream about sixty feet wide, two to six feet deep and contains fresh water. The McLeod can be used to develop water-power. There was fine weather at time of survey (November) with frosts. Fuel consists of plenty of dry wood, poplar, jackpine and spruce, but no coal, stone quarries nor minerals were found. Game consists of moose, bears, deer, wolves, &c.—*J. C. Baker, D.L.S., 1907.*

77. The southeast quarter of this township will make first class farms. The soil is clay and black loam on clay subsoil, and grows peavine vetch and grass where the timber is not too thick. The Peace river road passes in a northwesterly direction through these sections, and the timber along this road is open poplar bush and willow

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 16—Continued.

bunches. Several open prairie spots occur while the whole is well watered with small streams of fresh water. The timber on the rest of the surveyed portion of this township is mainly poplar two to twelve inches in diameter with scattered spruce, and willow between the ridges. A few large spruce were seen on section 10 being around a portion of a large spruce muskeg extending into the southwesterly portion of the township. Another road has been cut from the Big Prairie settlement northerly through sections 2, 11 and 14 to the Peace river road which is used by freighters and others to shorten the distance coming from the south and west. No rocks, coal or hay lands of any size nor game were seen.—*Henry W. Selby, D.L.S., 1907.*

Range 17.

51. This township is mainly a series of ridges of brulé, and intervening valleys of very soft muskeg. The ridges are about thirty or forty feet high, but some of them rise to a height of about one hundred and fifty feet. Though the ridges in general are brulé one instance was noticed of a ridge about two miles long, being heavily timbered with jackpine about two feet in diameter.—*Geo. Ross, D.L.S., 1907.*

52. McLeod river flows through the northern part of this township, entering it at the northwest corner of section 31 and flowing out northerly at the northeast corner of section 35. The river has an average width of about four hundred feet in this vicinity, and in general has steep banks about fifty or sixty feet high, and from the top of the banks the land has a gradual upward slope for some distance back. In some cases, the river runs in a valley in which there are wide flats and good hay meadows. The surface of the northern part of the township in general is high and rolling and the greater portion of it is brulé, being well burnt off, and now contains little timber of much value, although there are scattered small areas of medium sized spruce. The brulé in general has a small amount of fallen timber and a growth of either poplar or jackpine brush. The south one-third of the township is mainly a succession of muskegs, lying between a series of brulé ridges, with small poplar and jackpine, and this portion of the township is not suitable for settlement. The soil is mainly light sandy loam or sand, and in the swampy or lower lands in the northern part of the township the soil is black muck with a clay subsoil. In the northern two-thirds of the township, there are considerable areas of fairly desirable agricultural lands, but the greater portion of it is rather too light for successful grain growing. The Yellowhead pass trail runs through the northern part of this township and crosses McLeod river by a ford about one and a half or two miles west of the east boundary of the township. This township is well watered by many small creeks which flow into McLeod river.—*Geo. Ross, D.L.S., 1907.*

53. I reached this township by making my own pack trail. 'Jock's trail' passes along the west boundary of this township. It is in fine condition. The soil is black loam and clay. It is suitable for farm purposes. The surface of this township is level except near the McLeod where it is rolling. It is covered with poplar, willow, spruce and tamarack. It is very heavy in the northern part but there is no timber in the township. There are no hay lands. McLeod river flows through the southern part of the township. There are also some creeks. The water is fresh in all. Water power may be obtained by damming McLeod river. Fine weather existed at time of survey (November) with frosts. Fuel consists of plenty of dry wood such as tamarack, spruce, poplar and jackpine. Small pieces of coal were seen along McLeod river. Some sandstone along the McLeod river might be used for building purposes. No

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 17—Continued.

minerals were seen. Game consists of moose, deer, bears and wolves.—*J. C. Baker, D.L.S., 1907.*

53. McLeod river runs through the southeasterly corner of the township, and along its southeastern bank there is an outcrop of sandstone about twenty feet thick; on the northwestern bank the outcrop of sandstone is about eight feet thick. The face of this sandstone is weathered and rather soft, but no doubt good building stone can be easily quarried here. Moose creek also runs northerly through section 1, in a wide and deep valley, on its way to join the McLeod. Along its banks also there is an outcrop of sandstone. In the vicinity of McLeod river the land is inclined to be high rolling and hilly. The whole southern portion of the township, in general, is high, dry and rolling, but there are a few depressions where the land is comparatively low and moist and in the southeast corner of the west half of section 3 there is a small lake, surrounded by marshy land having a growth of tamarack and spruce from four to eight inches in diameter. With the exception of the swamp mentioned, and a few small areas of spruce of medium size, the southern part of the township is mainly *brulé*, having a moderate amount of windfall and a growth of willow brush, or young poplar and jackpine. In the southern part of the township, particularly in the vicinity of McLeod river there is a good deal of light sandy soil, but interspersed through this part of the township are also areas of clay or clay loam and although a cursory inspection would indicate that the soil in general is rather too light for successful farming operations, I have no doubt the greater part of the township will be found to contain considerable areas on which grain growing and gardening can be carried on successfully.—*Geo. Ross, D.L.S., 1907.*

Range 18.

52. This township in general is high and rolling and wooded with poplar, spruce and jackpine, from three to seven inches in diameter. McLeod river meanders through the western part of it in a wide and deep valley in which there are several good hay meadows. All along the river are found many clumps of spruce, the trees averaging about ten inches in diameter, and running to a height of about sixty feet, but the timber in general is only fit for fuel or fencing, though the better portion of it is suitable for building log houses. The soil is mainly clay loam, but several sandy ridges are met with, and in the eastern part of the township a considerable number of swamps with tamarack and spruce are to be found. The greater portion of the township is well fitted for settlement, and when cleared will be found to be well adapted for grain growing and mixed farming.—*Geo. Ross, D.L.S., 1907.*

53. A loop of McLeod river runs through the southern part of this township flowing in at the south through the west part of section 4 and returning south again through the east half of section 2. The river in this township flows mostly through an open flat, or valley in which there are good meadow and farm lands. Sundance creek flows into McLeod river a short distance south of the point where its most northwesterly loop takes a sharp bend to the east, forming an eddy in the river, and on the high bank of the river, to the north overlooking this eddy a store in which general merchandise is sold, was opened, about two years ago. This place is called 'big eddy;' and on the bottom lands, on the north side of the river, just east of 'big eddy' Mr. A. Sinclair, who squatted here, has erected a good log house and stable, and has a nice garden, where he successfully grew last season, onions, lettuce, cabbages, carrots, parsley, potatoes, &c., and had also a fine crop of wheat on a small patch which he sowed as an experiment. Mr. B. Berthoux, the storekeeper also had

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Range 18—Continued.

good success with a garden, which he cultivated on the upland adjoining the store. To the north of the river and Sundance creek the land is high and rolling and in general is covered with a growth of small or medium sized poplar. In going north from the top of the steep bank of the river at big eddy the land has an upward slope for a distance of about thirty chains and there attains a height of about two or three hundred feet above the river then for about half a mile farther north the surface is fairly level, with scattered medium sized poplar, then going farther north, the land is heavy rolling, with thick poplar and willow brush, and scattered groves of jackpine from four to ten inches in diameter. A few swamps with spruce and jackpine are also to be found and towards the central part of the township a steep ascent of two or three hundred feet is met with, which takes one up to a higher plateau, which is more or less rolling and covered with brush, the surface being broken by an occasional valley with thick brush or a ridge with balsam poplar. The southwestern part of the township is watered by Sundance creek and its tributaries. This creek flows through a wide and deep valley in which there is a good deal of land that is more or less open, and covered with a fair growth of grass, that makes it of value as a grazing ground. Sundance creek is a fine stream of pure water, about twenty feet wide, and from about two to five feet in depth, flowing with a fairly rapid current. In the vicinity of the creek, groves of fair sized spruce and jackpine are met with. Going southwesterly from the creek the land rises to a height of more than a hundred feet above it, the surface being considerably broken by spruce and tamarack swamps. The higher land or ridges separating these swamps is mainly brûlé. The portion of this township lying north of McLeod river and Sundance creek, is well adapted to agricultural purposes in general, the soil being mostly a rich brown loam. The southwestern portion, south of Sundance creek is not so desirable for farm lands, as it is more broken and is rated as third class land. The Yellowhead pass trail traverses this township passing through big eddy, and generally keeping a short distance north of McLeod river and Sundance creek. The surveyed line of the Grand Trunk Pacific railway also goes through this township, passing in the immediate vicinity of 'big eddy.'—*Geo. Ross, D.L.S., 1907.*

54. This township is somewhat similar to the northern part of township 53, adjoining it on the south, but heavier rolling. The soil in it is mainly clay loam and well adapted for agriculture, but is rather too heavy rolling.—*Geo. Ross, D.L.S., 1907.*

Range 19.

52. This township is traversed by McLeod river and broken by numerous swamps muskegs and shallow lakes. The northeastern portion of the township consists of a succession of low ridges on which there is a growth of poplar from two to six inches in diameter, with intervening marshes, muskegs, and shallow lakes. There is also an occasional area covered with spruce and jackpine. In the northern part of section 36 there is a fine lake which also extends north into section 1, township 53. This lake is rather less than a mile across, and on its south side there is high, hilly land, well wooded with spruce and jackpine. In running the fourteenth base line west from the east boundary of range 13, no true muskegs were met with till this township was reached; and in this township the greatest chainage across any muskeg was about twenty-two chains. The land improves in the northwestern portion of the township and in the north part of section 32, in the vicinity of Whitemud, there is a considerable tract of good open meadow land. Whitemud creek, which is about seven feet wide and three feet deep, running with a fairly rapid current, flows through this meadow, and empties into McLeod river in section 31. On the banks of this creek,

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Range 19—Continued.

in the valley of McLeod, a short distance above its junction with that river, are the ruins of a few shacks or log houses, which mark the site of a small village or trading post in which several half-breed families, principally engaged in trapping, lived some years ago. Near these ruins is also a small cemetery. The surveyed line of the Grand Trunk Pacific does not pass very far from Whitemud, and I have no doubt, that in the near future, Whitemud will spring into new life and become the centre of a thriving settlement. The Yellowhead pass pack trail, after turning northerly away from McLeod river, at big eddy, again approaches the river at Whitemud and follows it westerly, more or less closely, to 'the leavings' in range 21. In the valley of McLeod river, in the vicinity of Whitemud, are considerable areas well wooded with spruce and jackpine averaging ten or twelve inches in diameter. I did not examine the southern portion of this township but consider that it is somewhat similar to the northern part, which is rather too much broken to be well fitted for good agricultural lands. The soil is mostly a light sandy loam but there are considerable areas, such as is to be found in the vicinity of Whitemud, that will prove to be well adapted for farming. The timber is suitable for fuel, fencing, building, log houses, &c.—*Geo. Ross, D.L.S., 1907.*

53. This township is traversed by Sundance creek, which enters it some distance south of the northeast corner, then flows southeasterly to a point about a mile north of its south boundary, and two and a half miles west of its east boundary, then it turns and flows northeasterly into range 18, on its way to enter McLeod river at 'big eddy.' Sundance creek flows through a wide and deep valley, in which there are some small areas of high dry prairie land, and also some groves of fair sized jackpine. In the central portion of the township, along Sundance creek, there are some large swamps, partially open muskeg and partially wooded with tamarack. The southeastern portion of the township lies at an elevation of about a hundred feet above Sundance creek, and consists mainly of a succession of ridges, *brulés*, with second growth poplar, or poplar brush, and intervening swamps with spruce or tamarack, averaging about five inches in diameter. The south portion of section 1 is broken by a lake having a considerable area of marsh and muskeg along its north shore. In the southeastern portion of the township there are also a number of open marshes, about thirty or forty acres in extent, covered by two or three feet of water and having a growth of coarse grass. The south central portion of the township is broken by a number of small shallow lakes, and muskegs, which lie between ridges covered with *brulé*, having a considerable amount of windfall, and occasional poplar bluffs. In the southwest and central portion of section 6, is a wide ridge, well wooded with poplar. North and south of this ridge are fairly open flats, or meadow land with a growth of grass and small scrub. The south half of this township though considerably broken contains many areas of good agricultural land that can be readily cleared and brought into cultivation. The soil is mainly sandy loam or sandy clay, suitable for grain growing or gardening. The timber is mainly fit for the ordinary purposes of settlers, such as providing fuel, rails for fencing, and timber for the construction of log buildings. The Yellowhead pass trail traverses the southeasterly part of the township, and the surveyed line of the Grand Trunk Pacific railway also passes through the township. The northern portion of this township was not explored by me.—*Geo. Ross, D.L.S., 1907.*

52. McLeod river flows from west to east through the northern part of this township, keeping at an average distance of a little more than a mile south of its north boundary. It runs in a wide and deep valley, in the flats of which are several good hay meadows, but in general they are timbered with spruce, jackpine and cotton-

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Range 19—Continued.

wood from eight to twelve inches in diameter. From the north boundary of the township to the top of the bank of the valley a distance varying from about a quarter to three-quarters of a mile, the land is nearly level or gently rolling, and is mainly brulé, with light scrub, but occasional areas of spruce, jackpine and poplar from two to five inches in diameter are to be found. The soil varies from light sandy loam to clay loam, on the higher lands, and in the swamps it is black muck or peaty loam. In the river valley, the soil varies from a rich dark alluvium to gravel. The portion of the township north of McLeod river is well fitted for settlement, and when cleared, and cultivated, will prove to be an area on which grain growing or mixed farming can be carried on successfully. The Yellowhead pass trail runs through the township from east to west, keeping a short distance north of McLeod river, and the surveyed line of the Grand Trunk Pacific railway follows along about the top of the north bank of the valley of this river.—*Geo. Ross, D.L.S., 1907.*

53. The southern portion of this township is mainly light brulé, through which run narrow belts timbered with poplar, spruce and jackpine, from two to five inches in diameter. The surface is rolling or gently rolling. Near the centre of the south boundary of section 6 a creek about twenty feet wide and one foot deep, with a very rapid current is crossed. This creek is the outlet of a small lake lying about a mile and a half north of the south boundary of the township, and as this creek has a heavy fall and a steady flow of water it would be readily available as a small water-power. The timber found in the township is only valuable for fencing or fuel. The soil varies through the grades of light sandy loam, clay loam and clay, and in a few small areas it is gravelly. The township as a whole is well fitted for settlement and when cleared, grain growing and mixed farming can be carried on in it with general success.—*Geo. Ross, D.L.S., 1907.*

Range 21.

52. McLeod river flows through the northerly part of this township from west to east, in a wide valley, depressed about sixty feet below the level of the adjoining lands. Along the river in the flats of this valley, there are several fine open hay meadows, varying in width from ten to forty chains. Other portions of the valley are wooded with spruce, averaging ten inches in diameter, or cottonwood from eight to fourteen inches in diameter, also in places, the valley is broken by ridges of gravel. In going north from the river, after crossing the bottom lands one passes up the bank of the valley, about forty feet high, then through a poplar wood about twenty chains wide, the trees averaging about eight inches in diameter, then through a belt of swampy land with spruce, then over a ridge about fifteen chains wide, timbered with poplar, next through a strip of mossy swampy land, wooded with spruce, then over an area of high brulé with a good deal of windfall, and a growth of small jackpine, and on the whole the greater part of this township is brulé, interspersed with small areas of poplar, spruce and jackpine, averaging about five inches in diameter though in places as already mentioned trees of larger size are met with. 'The leavings' on McLeod river in the western part of the township is an open flat or meadow, about forty chains long and thirty chains wide. At this place the Yellowhead pass trail leaves McLeod river, and runs westerly towards Athabaska river. From 'the leavings' also another loop of the trail, runs in a northerly and north-westerly direction into township 53, range 22, and passes around the northerly end of the high plateau or divide between McLeod and Athabaska rivers, and again turns southerly and southwesterly along the southeasterly side of Athabaska river, till it again joins the old trail near Sandstone creek. That portion of the trail between

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Range 21—Continued.

'the leavings' and Sandstone creek, has not been much travelled during the past few years, having become blocked up by fallen trees and the travel went over the northerly loop, however during last season the more southerly and direct route was reopened and travel is now divided. The soil in township 52, range 21, is mainly light sandy loam, interspersed with small areas of stony clay. black muck, &c. In the valley of McLeod river, the soil is mainly a rich dark alluvium. The township as a whole is fairly well adapted for agricultural purposes. The timber is only suitable for the ordinary uses of settlers such as providing fuel, fencing and logs for buildings. The surveyed line of the Grand Trunk Pacific railway passes through the northern part of this township.—*Geo. Ross, D.L.S., 1907.*

53. This township is broken considerably by a number of lakes and swamps. Along the southern boundary, sections 1 and 2 are light brulé with second growth poplar, section 3, stony land with second growth poplar and jackpine, sections 4 and 5 are mainly light brulé, and the southwesterly part of section 5 is broken by a small lake. Section 6 is mainly mossy swampy land. The soil is principally sandy loam, with interspersed areas of stony clay. I did not explore the northern portion of this township, but apparently considerable areas of fairly good agricultural land are to be found scattered through it.—*Geo. Ross, D.L.S., 1907.*

84. (Peace River Landing settlement.) This settlement, situated east of Peace river and near North Heart river is on a flat about fifteen feet above the river. It is surrounded on the east and south sides by hills of six hundred to eight hundred feet above the river. There are ten lots of different sizes in the settlement. The soil is a deep black sandy loam resting on a clay and sandy clay subsoil. Grain and vegetables grow well. Good water is plentiful all through the settlement and wood for fuel is close by. This settlement is reached by the Lesser Slave lake and Peace River Landing wagon trail. There is no water-power, nor stone quarry, and no mineral of any description has been found there during the progress of the work. The people of the place cut their hay on top of the hills along the wagon trail. The Northwest Mounted police have their quarters south of North Heart river, farther up Peace river.—*J. B. Saint Cyr, D.L.S., 1907.*

Range 22.

52. The greater portion of this township is rough and broken; the northeastern part of it is swampy with spruce, five inches in diameter, or brulé, with a good deal of fallen timber, and a growth of young jackpine. The western part of the township is occupied by the high ridge, or divide between McLeod and Athabaska rivers. The greater part of this divide is covered with heavy brulé, on which there is a thick growth of young jackpine, though in places the jackpine is replaced with poplar and willow brush, or by a growth of spruce. Section 33 and the northwest quarter of section 34 on this divide is heavily timbered with spruce and jackpine from six to twenty-two inches in diameter, this tract of timber stretches southwesterly for a distance of about two miles. The easterly side of this high ridge or divide trends southwesterly parallel to McLeod river and forms the northwesterly bank of its valley. The valley of the McLeod, which occupies the southeasterly part of the township is the most desirable part of it and is well adapted for mixed farming or grazing lands. The soil in the valley, is a rich, dark alluvial deposit, and in the remainder of the township it is mainly a light sandy loam, fairly well adapted for grain growing. The timber on section 33 and the northwest quarter of section 34 is suitable for lumber, but in general the timber to be found is mainly suitable for fuel, &c.—*Geo. Ross, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 22—Continued.

53. The southeastern part of this township is rather low and swampy, and also broken by small lakes, surrounded with green spruce or tamarack, varying from three to six inches in diameter, but there is also a good deal of brulé to be met with. The southwestern portion of the township is occupied by the northerly end of the high ridge or divide lying between McLeod and Athabaska rivers. Section 4 on this divide is heavily timbered with spruce and jackpine from six to thirty inches in diameter and scattered poplar from ten to eighteen inches in diameter. About the north end of section 4, the timber is mainly spruce from eight to twenty-four inches and scattered poplar up to eighteen inches in diameter. In going northerly from the north boundary of section 4, the land slopes downward for the distance of about sixty chains, where a ravine fifty or sixty feet in depth, and heavily timbered with spruce and jackpine up to three feet in diameter is reached. In the bottom of this ravine a stream about two feet wide and fifteen inches deep runs easterly with a rapid current. From the top of the bank on the north side of this ravine the land has a gentle slope downwards towards the north and is timbered with spruce, jackpine and poplar from twelve to thirty inches in diameter, and about a mile north of the ravine another stream about two feet wide and eighteen inches deep runs northeasterly with a rapid current. Going north from this creek the land still slopes downward and the timber is smaller running into spruce about six inches in diameter. Here the survey lines of the Grand Trunk Pacific railway are met with, as they curve around to the north, to avoid the heavy grade that would be necessary, if the direct route across the divide were taken. Another creek about three feet wide and one foot deep, flowing northerly with a rapid current, is met with in the smaller spruce. Sections 5 and 6 are covered with heavy dry standing timber and section 6 and the west half of section 5 are on the westerly side of the divide, and slope northwesterly towards Athabaska river. North of sections 5 and 6, the land is brulé, and descends towards the Athabaska for the distance of about a mile, then gradually rises into a high ridge, which is timbered with spruce and jackpine of medium size. Athabaska river runs through the northwestern part of the township in a wide and deep valley. The soil in this township is light sandy loam interspersed with areas of yellow sandy clay, and would be fairly well adapted for agricultural purposes. On the south central portion of the township as previously referred to there is a considerable area of timber suitable for lumbering purposes.—*Geo. Ross, D.L.S., 1907.*

52. Athabaska river flows through the northwestern corner of this township in a deep valley in which the bottom is rather narrow and confined, being wooded or brulé rather than hay flats, however on the northwesterly side of the river, both in the valley and on the plateau above, there is a considerable stretch of brulé, in which there is a good growth of grass. This portion of the township, on the northwestern side of the river is principally light brulé, with second growth poplar, and scattered small areas of medium sized spruce and jackpine, and is mainly high dry land ascending towards the west, and is broken by the deep valley of a creek running southeasterly into Athabaska river. All the central part of this township on the southeasterly side of Athabaska river slopes northwesterly towards the river, and forms the southeasterly side of its valley. In the vicinity of the river on this slope are considerable areas of live spruce and jackpine, but fire has made many inroads into the timber, leaving lanes and patches of brulé with a large amount of fallen timber. Back of the live timber farther up the slope of the valley the central portion of the township is mainly heavy brulé. The southeastern part of the township is on the top of the divide between McLeod and Athabaska rivers and is brulé with interspersed small areas of live spruce and jackpine. The soil in this township is light

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 22—Continued.

sandy loam, and interspersed areas with yellow sandy clay, or gravelly soil. The surface is well watered with many small and medium sized creeks and when cleared should make good agricultural or grazing lands.—*Geo. Ross, D.L.S., 1907.*

53. Athabaska river flows northeasterly through this township and cuts off its southeast corner in the form of a triangle, having its south and east sides each about four miles in length. The whole of this triangle, except minor undulations, slopes northwesterly towards the river and forms part of the bank of its valley. The greater part of this triangle is brulé with a large amount of standing dead timber, but near the river, in the southern part of the township, there is a tract about two miles long and half a mile wide, wooded with poplar, spruce and jackpine from six to twelve inches in diameter. The northerly loop of the Yellowhead pass trail, which comes around by the northerly end of the high divide between McLeod and Athabaska rivers passes through this woods. A medium sized creek, flowing in a deep valley, cuts into the southwest corner of this township and a short distance north of this valley, the easterly side of a high hill or ridge projects into this township from the west, and its top, which rises to the height of one thousand feet above Athabaska river, is very light brulé, or nearly open prairie. The northwesterly part of the township is high rolling, and broken by a number of high ridges, partly wooded with spruce and partly very light brulé. soil in this township is mainly light sandy loam, but there are tracts of clay with a stony or gravelly subsoil. Some portions of this township are rather rough and high rolling, but large parts of it when cleared will make good agricultural or grazing lands, and the township is well watered throughout, with many small and medium sized creeks. The timber is suitable only for meeting the ordinary requirements of settlers. Athabaska river in this township averages about five hundred feet in width.—*Geo. Ross, D.L.S., 1907.*

Range 24.

51. Athabaska river flows northeasterly through the northwest corner of this township, and the Yellowhead pass trail runs through it, parallel to the river, keeping about half or three-quarters of a mile southeast from it. In the vicinity of the trail there is a fine stretch of prairie bottom land, with good grass, the soil being a rich brown loam. Between this strip of prairie land and the river, is a belt of second growth jackpine, and the northwesterly side of the river rising with a fairly steep, but gradual ascent, is also clothed with second growth jackpine. On the southeasterly side of the river, the bank of the valley rises to a high plateau, with light brulé, nearly open in many places, but generally with scattered poplar and jackpine. The valley on the southeasterly side of the river is a desirable location for homesteading, being well adapted to grain growing or mixed farming and the township as a whole will no doubt prove to be well adapted for these purposes. The survey line of the Grand Trunk Pacific railway runs through the township not far from the Yellowhead pass trail.—*Geo. Ross, D.L.S., 1907.*

52. Athabaska river flows northeasterly through the southeasterly part of this township, but there is little or no bottom or grazing land in its valley on either side of the river in this township. The northern part of the township is mainly heavy rolling land with a general ascent to the west, away from the river, and continues to rise, till near the northeast corner of section 31, where the top of the plateau or 'mountain' is reached, it attains an elevation of 4850 feet, or about 1750 feet above Athabaska river. The greater part of this township is more or less rolling and covered with brulé, having scattered areas of second growth poplar, or groves of medium sized

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 24—Continued.

spruce, but in the northwest corner of the township on the top of the plateau or 'mountain' is a heavy growth of spruce from six to twenty-two inches in diameter. In this township the comparatively level plateau or 'mountain' extends only about twenty or thirty chains south of the north boundary of section 31, and then slopes southerly down to the valley of the Athabaska. On the shoulders of this slope is a good deal of medium sized spruce and jackpine. The soil varies from sandy loam in certain portions of the township to yellow clay in others, and the greater portion of the township will no doubt be found to be fairly well adapted for grain growing or mixed farming. The timber generally is fit only for the ordinary purposes of settlers except at the northwest corner of the township where it is suitable for lumber.—*Geo. Ross, D.L.S., 1907.*

53. A creek about fourteen feet wide and seven inches deep flows through the southeasterly part of this township in a wide valley, about a hundred feet deep on its way to join Athabaska river. Immediately north of the valley of this creek in section 1, the land rises into a high hill, which attains an elevation of about four thousand one hundred feet or about one thousand feet above Athabaska river in its vicinity. The top of this hill is very light brulé or nearly open prairie. Sections 1, 2, 3, 4 and 5 in this township are principally rolling and ascending land, brulé with a few areas of poplar and spruce, but towards the west side of the south boundary of section 5 at the top of a steep ascent, a heavy spruce wood is entered, and the easterly slope of this ascent sweeps northerly and easterly in a crescent form and circles back easterly to the shoulders of the high hill rising in section 1, striking it about two miles north of the south boundary of the township. The top and southerly slope of this hill, which thus extends in crescent form from west to east are clothed throughout with a heavy growth of spruce from six to twenty-two inches in diameter. This heavily timbered land stretches to the north forming an area that is suitable for lumbering operations. The brulé and more open parts of the township will no doubt prove to be well adapted for ordinary agricultural purposes. The soil varies from light sandy loam in places, to clay that is more or less stony in other parts of the township.—*Geo. Ross, D.L.S., 1907.*

Range 25.

30. This township is traversed by Columbia river. It is mostly mountain side and high bench land, timbered with fir. There is an extensive flat off the west side of Columbia river below the mouth of Beaver river, timbered along the river with spruce.—*Jos. E. Ross, D.L.S., 1907.*

31. Columbia river traverses the westerly half of this township. It is mostly mountain side with high benches. There are some flats along the river timbered with spruce.—*Jos. E. Ross, D.L.S., 1907.*

51. Athabaska river flows northeasterly through this township, dividing it into two nearly equal parts. All the central part of the township is occupied by the valley of this river, in which there is a large amount of nearly open land, with a good growth of grass, and well adapted for grazing. The river here is about four hundred feet wide, and runs with a rapid current in a rocky bed. The banks between the river and the first flats of its valley vary in height from four or five feet to fifty or sixty feet. On the northwesterly side of the river, and back from it about a mile and a half or two miles, the valley has in places rocky banks about forty or fifty feet high. The northwesterly part of the township is rolling land, mainly brulé with poplar brush and some areas of small spruce. In the vicinity of Prairie creek on the southeasterly side

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 25—Continued.

of the river the first flat adjoining the river is about six to eight feet above it being a stretch of nearly open prairie, about fifteen or twenty chains wide, then after ascending a bank about forty feet high, one reaches the second flat a wide tract of comparatively open land, very light brulé, with some scattered poplar brush. All the south-east part of this township is somewhat similar to this tract, the soil being a rich dark brown loam well adapted for grain growing or grazing. Some good seams of coal are also found in this portion of the township, which is traversed by the Yellowhead pass trail, and the surveyed lines, of the Grand Trunk Pacific railway are also run through it.—*Geo. Ross, D.L.S., 1907.*

52. The northern part of this township forms part of a high and heavily wooded plateau, or 'mountain' which extends westerly to Whitefish lake, in the western part of range 26. On this high plateau, sections 35 and 36 are covered with a heavy growth of spruce from eight to twenty-two inches in diameter, mixed with balsam from eight to twelve inches in diameter. Sections 33 and 34 also on this high elevation of land, are less heavily wooded with spruce and jackpine from six to eighteen inches in diameter. Sections 31 and 32, also on the 'mountain' are wooded with spruce from five to fifteen inches in diameter, but in sections 31, 32 and 33, there are several areas of partially open land, with a fair growth of grass. These sections are also well watered by several creeks from one to two feet wide and by one or two wider creeks up to twelve feet in width. The creeks in general run in stony beds with a fairly rapid current, in a northerly or northeasterly direction. The heavy woodland in the northern part of this township appears to have not been injured by fire for at least two hundred and fifty years, as many of the spruce trees have reached that age and growth rings counted on some of the balsam show that they were over two hundred years old. A few ponds, and open grass marshes, from one to twenty acres in extent are met with in the northern part of this township. The southern part of the township is mainly brulé, and has a general southerly descent towards Athabaska river. The soil in the northern part of the township where the land is well timbered, is mainly clay subsoil, under a fair depth of black loam, and would be well adapted for grain growing. The timber on the northeastern part of the township is suitable for lumber. On the remaining part of the township, the timber would only be suitable for fuel, fencing, &c. or the ordinary uses to which settlers would put medium sized trees.—*Geo. Ross, D.L.S., 1907.*

53. Sections 1 and 2 are heavily timbered with spruce from eight to twenty-two inches in diameter, sections 3 and 4, are timbered with spruce and jackpine from six to eighteen inches in diameter, and sections 5 and 6 have a fairly thick growth of spruce from five to fifteen inches in diameter, but on sections 4, 5 and 6 there are a few areas of limited size which are comparatively open and have a fair growth of grass. The southern portion of the township as described, is also well watered by many small and medium sized creeks flowing in a north, or northeasterly direction. The northern part of the township was not explored by me but it appears to have a general rolling descent to the northeast, and to be wooded with medium sized spruce. The soil is mainly clay, under black loam, and the surface being rolling, the greater portion of it when cleared would be very suitable for the ordinary purposes of agriculture. The timber on the eastern or southeastern part of the township is suitable for being manufactured into lumber, and on the remaining portion of the township it is valuable for fuel, or for meeting the ordinary requirements of the settlers.—*Geo. Ross, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 26.

31. Columbia river traverses the northeast corner of this township. The country is mountainous. Along the river there are some small flats timbered with spruce of from ten to twenty inches in diameter—*Jos. E. Ross, D.L.S., 1907.*

32. This township is traversed by the Columbia river. There are at the mouths of Bush and Gold creeks which flow into the Columbia from opposite sides, large flats marshy towards the middle and mostly timbered with spruce along the river. On the east side of Surprise rapids there is some low hilly land with high mountains in the rear. The river is winding with crosscut and back channels forming small islands.—*Jos. E. Ross, D.L.S., 1907.*

52. Whitefish lake, a beautiful sheet of fresh water about twenty-five chains wide, stretches north and south through the central part of sections 29 and 32, and also extends northerly into township 53, in this range. A creek varying from ten to twenty feet in width and from one to five feet in depth, flows northerly, through a valley with bottom lands, about half or three-quarters of a mile wide into the south end of Whitefish lake. At several points in this valley the creek broadens out into small lakes or ponds. The bottom land along the creek is mainly open meadow, with a good growth of grass and peavine but it also contains patches of scrub and groves of poplar and young jackpine. On the east side of Whitefish lake is a valley about twenty chains wide, *brulé* more or less open and broken by gravelly ridges and on the east side of this valley is a cliff, or terrace of sandstone about one hundred and twenty-five feet high. The cliff extends south of the southerly limit of Whitefish lake along the easterly bank of the valley of the creek formerly mentioned for a distance of about two or three miles. From the top of the sandstone cliff east of Whitefish lake the land ascends to the east into a high plateau or 'mountain' attaining an elevation of about one thousand feet higher than the lake. The 'mountain extends east occupying the northeastern part of this township as well as the portions of ranges 25 and 24 previously referred to. The greater part of the plateau in this township is heavy *brulé* with scattered areas of spruce except in section 36, on which there is a fairly thick growth of spruce from three to fifteen inches in diameter. The southern portion of the township below this 'mountain' is rolling land being mainly *brulé* with young poplar, and interspersed with areas of small spruce. The part of the township west of the valley running south from Whitefish lake is inclined to be hilly, and is covered with *brulé*, and intermingled areas of medium sized spruce. Immediately west of Whitefish lake, in sections 31 and 32, there is a considerable tract of very light *brulé*, or almost open prairie, but the soil is rather gravelly to make good agricultural land. The central portion of section 31 is occupied by a fine dry open hay meadow about one hundred acres in extent. The northern portion of Whitefish lake is quite shallow, but it is not marshy, and the southern part of the lake is in general very deep. This lake contains great quantities of large whitefish and pike, and several families of beaver apparently flourish here. The Smoky river trail, running northwesterly from Prairie creek to Smoky river, crosses the southwestern part of this township, runs northerly through the valley extending south from Whitefish lake, passes along the west side of the southern part of that lake and then turns northwesterly. This trail is in fair condition, but it is not much travelled. Considerable areas of this township are quite desirable for settlement, being well adapted for agricultural purposes, the soil being clay or clay loam underlying a few inches of black loam, but light sandy loam and gravelly areas are quite numerous. The valley running south from Whitefish lake, though rather confined in area, is probably the most desirable location in the township.—*Geo. Ross, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE FIFTH MERIDIAN.

Range 26—Continued.

53. This township is mainly brulé, with occasional areas of young spruce, jack-pine and poplar. The surface is heavy rolling and consists mainly of a series of high ridges with intervening deep valleys. Whitefish lake extends northerly, from township 52, into section 5, for about three-quarters of a mile. This northern portion of the lake is quite shallow, a good deal of it being only two or three feet deep, but not marshy, although in other parts of the lake, the depth is quite great. A creek varying in width from about forty to one hundred feet, and about three feet in depth flows northerly out of the north end of the lake with a slow current. Along this creek, are low flats, about twenty chains wide, having a growth of short wiry grass. In this flat, the creek enlarges into an occasional pond, but about half a mile below the point at which it issues from the lake, it is well confined to its banks. Immediately west of the creek flats, there is a second flat, which is about twenty feet above the creek, being nearly open prairie and about twenty chains wide, west of this is a similar flat about twenty feet higher, and west of that again a hill, or ridge rises to the height of about one hundred and fifty feet above the creek. On the east side of the flats of the creek the sandstone cliff or terrace which extends northerly from township 52, rises to the height of about three hundred feet above the lake. About two and a half miles below the point at which it leaves the lake, the creek narrows down to a width of about fifteen or twenty feet, and runs with a rapid current, over a stony bed. This creek trends in a northeasterly direction and flows through a deep valley, having the sandstone cliff on the east side and a high steep clay or gravelly bank on the west side of its valley. The land in the vicinity of the creek is brulé with scattered groves, or clumps of second growth spruce and jackpine. In this township, the soil, on the ridges is sandy or gravelly loam and in the lower or bottom lands between the ridges it is black muck or black loam. In these bottom lands there are also considerable areas with a good growth of grass. The land generally is well watered with many small streams, and large areas when cleared would be better adapted for grazing lands, than for grain growing.—*Geo. Ross, D.L.S., 1907.*

Range 27

52. The surface of this township is in general, high rolling or hilly and the greater portion of it is brulé with scattered areas of spruce. It is well watered with many small creeks, and Hay river, a fine stream of pure water about fifty or sixty feet wide, and from two to five feet deep flows with a rapid current through the northwest part of the township. In the bottom of the valley of this river are groves of poplar, cottonwood and spruce from six to fifteen inches in diameter. The slopes of the valley are covered with brulé and scattered areas of medium sized spruce. The Smoky river trail runs through the northeastern part of the township, and it is in fair condition, but there is very little travel on it. The older trails as shown on previous departmental maps, are now apparently obliterated. The soil is mainly light sandy loam, but there are considerable areas with clay loam and stony clay. At the northeast corner of the township there is a tract of good agricultural land, but on the whole the township is not well adapted for settlement.—*Geo. Ross, D.L.S., 1907.*

53. This township is mainly brulé interspersed with a few areas of medium sized spruce and jackpine, and consists of a series of high ridges, and deep valleys. Hay river flows diagonally through the southeast part of the township in a wide and deep valley, in which there are some bottom lands with good grass, and Smoky river trail runs northwesterly through the southwestern part of the township. This township is not well adapted for settlement, being on the whole rather rough, and high

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Range 27—Continued.

rolling with the exception of two or three sections at the southeast corner. The soil is mainly sandy loam. Fractional township 52 and 53 in range 28 are mainly brulé and rather too high rolling and broken to be of much value for settlement.—*Gen. Ross, D.L.S., 1907.*

TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 2.

23. (*Section 21.*) The section can be reached by a rough wagon road running southerly from the sawmill at the 'big eddy' of Columbia river, on the main line of the Canadian Pacific railway. The northeast quarter of the section is rocky, and rising towards the west. It has a light covering of earth, generally stony. A growth of hazel, willow and poplar scrub with a few second-growth white pine covers the ground. The north half of the southeast quarter is similar to the northeast quarter. The south half has a southerly slope. While broken with rocky ridges there is a considerable area of sand and gravelly soil that would probably make good fruit land, but in dry seasons lack of moisture would be a drawback, as owing to the roughness of the surface and its elevation it is impossible to irrigate it. Second-growth white pine trees are scattered over the quarter section and if not injured by fire they will when mature be valuable. They are from five to nine inches on the stump. The north and east halves of the northwest quarter are rocky with a light covering of soil, light scrub and second-growth pine. The southeast quarter is broken with rocky ridges. Between the ridges there are areas of flat land, generally marshy, with clear spaces that when drained will be ready for cultivation. The remainder is covered with a thick growth of scrub and fallen timber, the result of fire. A few cedar and hemlock trees of small size growing in clumps will furnish considerable firewood. There is no land producing hay, other than a space of about five acres that has been sown in timothy by the former settler mentioned herein. Springs of fresh water that are probably permanent will provide water for domestic purposes. The flat land is covered with water in the spring but clearing and a simple system of drains will prevent flooding. There are no water-powers. The climate is equable, being similar to that of Revelstoke. There is deep snow from December to the end of March, or later. Rainfall is generally sufficient without irrigation. I do not think summer frosts prevail. Rock exposures are broken up and are not suitable for structural purposes. There are no veins of coal or lignite, or minerals of economic value so far as known. Bear and grouse are plentiful. The remains of two cabins and a small clearing show that the place has been occupied at one time, but the improvements are now in ruins, and it has evidently been abandoned for some time.—*J. A. Kirk, D.L.S., 1907.*

Range 3.

77. Two-thirds of this township is thickly timbered with spruce, jackpine, poplar, birch and large willow, being on the Birch hills. There are a few creeks coming out of those hills running until the middle of summer. The surface on section 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 in that township is prairie and bluffs. The soil is very good, and game such as bears and moose are plentiful in that part of the country. Twenty or thirty settlers could locate in the south portion of that township when subdivided. This township can be reached by Egg lake wagon trail.—*J. B. Saint Cyr, D.L.S., 1907.*

78. This township can be reached by the Egg lake and Spirit river wagon trail. With the exception of sections 1, 2, 3, 4, 5 and 6, where patches of prairie are met

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TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 3—Continued.

with, this township is thickly timbered with poplar, spruce and large willow. The country north of the wagon trail is level and the surface soil is very thin, overlying a clay and hard subsoil. On sections 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17 and 18 spruce suitable for lumbering purposes is plentiful. Brulé river, running in a deep ravine, crosses this township about three miles southeast of the northwest corner of section 31. There are no water-powers nor stone quarries, and water outside of Brulé river is rather scarce. Bear and moose seem to be plentiful in that district. Oxide of iron has been found in the cutbanks along the river at different places and principally in the neighbourhood of the mouth of Spirit river. Hay is not very plentiful in this township and can be procured in some sloughs towards the northeast corner of section 36. The northeast portion of this township is rolling, and the land adjoining Brulé river is very hilly. A few settlers could find enough open land in the first row of sections in the south of this township to make a good farm. The climate is the same as at Spirit river and early summer frosts are not very frequent.—*J. B. Saint Cyr, D.L.S., 1907.*

79. This township lying south of Peace river is all thickly timbered with poplar, large willow and spruce. The soil is comparatively poor. Brulé and Spirit rivers cross this township through its south portion. The hills of Brulé river are from three hundred to four feet in height and those of Spirit River are about two hundred feet high. There is no way of reaching this township at present unless by Peace river, but even by this way a road would have to be made to go up the hills.—*J. B. Saint Cyr, D.L.S., 1907.*

80. The surface in this township is prairie and bluffs. The soil is good. Wood for fuel is plentiful and timber for building purposes can be procured almost everywhere in this township. There are a few creeks there flowing to Peace river nearly all summer. This township can be reached by Peace River Landing and Dunvegan wagon road. Settlers will find there good locations when the subdivision of this township is made.—*J. B. Saint Cyr, D.L.S., 1907.*

Range 4.

80. The western half of this township is thickly timbered with poplar, spruce and large willow, while the remaining portion is prairie and bluffs. Very little of this township is surveyed. The soil appears to be fairly good. The country in the western portion of this township is hilly and rolling. The eastern half is nearly level. There are a few good sections here and there. The climate is very good all through that country and early summer frosts are not very frequent.—*J. B. Saint Cyr, D.L.S., 1907.*

Range 6.

19. A part of Shuswap river was traversed to complete a former survey. There is little level land along the river fit for settlement. While a good deal of it is gravelly and stony, there are some patches of good land.—*Jos. E. Ross, D.L.S., 1907.*

71. This township can be reached by Spirit river and Dunvegan wagon road. As in township 72 the country is undulating and the soil is a deep black loam or a deep black sandy loam resting on a clay or sandy clay subsoil. The surface in that portion of the township surveyed is prairie and bluffs. Lake No. 2 situated on east boundary of section 36 is very small. Bear creek crosses this township from section 33 to section 11. The supply of water furnished by the lakes and streams of this

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TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 6—Continued.

township is permanent but the best water of all is found in Bear creek. There are no water-powers and no stone quarries in this township. No mineral of any description has been found there during the progress of the work. Hay can be procured in good quantities all through this township. Wood for fuel is plentiful and timber for building purposes can be procured along Bear creek and towards the southeast portion of this township. Ducks and geese are plentiful in the spring and autumn on the lakes of this township. The climate is very good all through Grande prairie. Last summer there were two frosts in August, but the people of the place say that generally there are no early frosts in the summer. Grain and vegetables are successfully raised on Grande prairie. Flyingshot Lake settlement is included in this township. This settlement comprises sections 9 and 16 with eastern halves of sections 8 and 17 and western halves of sections 10 and 15, nearly two miles square. In the middle of this settlement is a small lake called Flyingshot lake. The survey of this settlement commenced on August 2 and was completed on the 20th. The surface is bluffs and prairie and the soil is composed of a deep black loam resting on a sandy clay subsoil. About three-quarters of the surface covered by the settlement is thickly timbered with poplar and large willow with a few spruce here and there. A small quantity of hay is cut around Flyingshot lake. Potatoes are raised successfully every year in that settlement and this summer small fields of oats were looking very fine. Flyingshot lake is very shallow and its water is not very good. Wood for fuel is plentiful in the settlement. There are no water-powers, and no mineral of any description has been found there. As in Spirit River and all through the west, two frosts were felt also at Flyingshot Lake settlement, but the people of the place say that the frost comes always later than that. The supply of water is permanent and more than sufficient for the needs of the settlement. Ducks and geese are plentiful in the spring and autumn around the lake. The climate is good and the autumn is generally long and fine. The country around the lake is undulating and rolling. There are no stone quarries. Most of the hay is cut outside of the settlement. The people of Flyingshot Lake settlement communicate with Saskatoon lake, Bear creek and Spirit river by two fairly good wagon roads in the prairie country, but through the timber between Grande prairie and Spirit river the road is in a very bad condition. These will improve with time for I was told in the fall that the government had men opening a new road on a better location. Flyingshot Lake settlement is in a low place and mostly surrounded with timber. The country is much nicer north of the settlement and near Bear creek.—*J. B. Saint Cyr, D.L.S., 1907.*

72. This township can be reached by Spirit river and Dunvegan wagon road which crosses this township from section 36 to section 1. The country is undulating and the surface is prairie and bluffs. The soil is a deep black loam resting on a clay or sandy clay subsoil. Hay is plentiful, a large quantity can be procured around Clairmont lake on the east boundary of this township and around Fergusson lake on sections 27 and 22. There is also a large hay slough or marsh on sections 20, 21, 28 and 29, and hay can be procured in good quantity near lake No. 1 and on section 19. Bear creek crosses sections 19, 20, 17, 8, 9, 4 and 3. Spruce creek which empties into Bear creek on section 19, coming from the north is a good-sized creek. The water in the lakes and streams of this township is permanent and good. Wood for fuel is plentiful. There are no water-powers, and no mineral of any description has been found in this township. There are no stone quarries. Ducks and geese abound in the spring and autumn in the lakes and streams of this township. This summer Grande prairie had a fine appearance; better grazing land cannot be seen anywhere else. Settlers will find there everything to meet their requirements. Frosts were felt here last summer also, but generally there are no early summer frosts. The climate is

SESSIONAL PAPER No. 25b

TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 6.—Continued.

very good and grain and vegetables are raised with success by the few scattered settlers of Grande prairie.—*J. B. Saint Cyr, D.L.S., 1907.*

78. (*Spirit River settlement.*) The survey of this settlement commenced on May 17, 1907 and was completed on June 19. Spirit river, which is a very small stream crosses the settlement from west to east. The soil is of good quality being composed of a black loam resting on a sandy clay subsoil. The surface is prairie and bluffs. The country is level with the exception of that portion of the settlement situated south of Spirit river. Wheat, oats and vegetables are successfully raised there, since a few years. The prairie furnishes a good pasture. The people here, cut their hay mostly outside of the settlement. Wood for fuel is plentiful. There is no water-power and no mineral of any kind has been found during the progress of the survey. The settlement comprises fifty-nine lots of different sizes. Nearly all the lots bordering on Spirit river are occupied by squatters. There are three good bridges on Spirit river, one on lot 16, one on lot 12 A and one on lot 9. The water supplied by Spirit river is not permanent. The river flows between two high banks, varying from fifteen to forty feet in height. The water is fairly good in the spring but towards the fall it is alkaline, owing to the alkaline springs coming out of the banks in different places. The climate is good with generally no early frosts, but last summer, in August, there were two frosts which injured the grain a little; these have been felt all over the west, I believe, and I was told also that the frost comes generally later than that. The country around Spirit river has a fine appearance. Every traveller that came there last summer appears to like the country and to have great faith in the future of that district. I never witnessed such fine weather as we had until late last fall. Some of the residents of the place are making arrangements with firms in Edmonton to procure a sawmill and boring outfit to reach water; the only drawback of that country during the dry years. Mr. James Brooks and others say that they will certainly find good water at a comparatively small depth. The boring will begin next spring. From this settlement there is a wagon road going to Grande prairie, and one to Dunvegan and Peace River Landing. There are no stone quarries. Game is not so plentiful as it used to be around here. Between Spirit river and Dunvegan lies a tract of very good land. It is undulating and rolling in some places.—*J. B. Saint Cyr, D.L.S., 1907.*

Range 7.

19. There is a little level land along Shuswap river fit for settlement.—*Jos. E. Ross, D.L.S., 1907.*

Range 8.

18. The section (6) surveyed is mostly steep rocky sidehill partly timbered and partly covered with brush. It is not fit for agricultural purposes.—*Jos. E. Ross, D.L.S., 1907.*

Range 9.

17. Only a small strip of land adjoining the provincial lots in sections 24 and 25 is fit for agriculture. The timber has been burnt off. The southeast corner is occupied by a high mountain.—*Jos. E. Ross, D.L.S. 1907 .*

18. The part surveyed is rolling hilly ground. Most of the timber has been burnt off and the country is now grown up with brush. It is fairly well watered. The soil is rather light but is suitable for fruit growing.—*Jos. E. Ross, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 9—Continued.

19. The part surveyed consists of gently sloping nearly level, lying between them. Thick brush now vious to a fire of some twenty years ago heavy timber well watered, but the soil is rather light. There are
Jos. E. Ross, D.L.S., 1907.

Range 10.

17. Most of the land surveyed lies on a small mountain valley of from five hundred to fifteen hundred feet. The higher part is rolling and hilly, timbered with small trees, good but the water is bad and rather scarce.—*Jos. E. Ross, D.L.S., 1907.*

18. There is about a section of good land on the west low rolling timbered hills with some gradual slopes. The west of this section and sections ten and twelve. The west of this section and sections ten and sidehills, open timbered range land. All the land in this is probably surveyed.—*Jos. E. Ross, D.L.S., 1907.*

19. The part surveyed is on the westerly slope of of agricultural land here would hardly warrant the watered and would be suitable for a stock range during unsurveyed land in this township is apparently not
Jos. E. Ross, D.L.S., 1907.

Range 11.

17. Section thirty-six is fairly good land but it is pretty heavily timbered.—*Jos. E. Ross, D.L.S., 1907.*

18. The several sections surveyed lie in Warren creek valley. This valley is about half a mile wide, is thickly wooded and almost enclosed by high hills.—*Jos. E. Ross, D.L.S., 1907.*

Range 12.

18. There is very little agricultural land, the country being in general hilly, rough and broken. There is a gypsum deposit in the northeast quarter of section ten.—*Jos. E. Ross, D.L.S., 1907.*

Range 14.

18. The part surveyed lies around Monte lake. It is hillside with open timber and a few small benches. The quarter sections at the south end of the lake are best suited for farming.

19. The land is at an elevation of at least two thousand feet above the valley. It is a hillside slope thickly wooded with small timber.—*Jos. E. Ross, D.L.S., 1907.*

Range 15.

19. This is range land. Three settlers have been located here for several years and have apparently been successful in growing grain.—*Jos. E. Ross, D.L.S., 1907.*

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TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 18.

20. This township lies immediately west of the town of Kamloops on the main line of the Canadian Pacific railway. Thompson river traverses the township providing an abundant supply of good water. The level bottom lands within the river valley are divided into lots and furnish superior grazing premises. The soil in these lots varies from sand to sandy loam and when irrigated is well suited to the cultivation of fruit and vegetables. Irrigation, however, is very costly. The land also is in danger of being flooded in times of exceptionally high water. To the south the country rises rather abruptly to a height of 1,800 feet above the valley. The hills are very sparsely timbered with fir and bull-pine. The soil is shallow, underlain with rock, and the surface stony with frequent rock exposures. The township is suited only for grazing purposes. Several mining claims have been staked though no mines were in operation at the time of the survey (June). The Iron Mask copper mine in township 19 has been worked to a considerable extent and extensive improvements made on the property. There are no stone quarries and no coal or lignite veins. Water-power could be developed on Thompson river at great expense. Hay is lacking except along the river flats mentioned above. Game is wanting. A limited quantity of fuel is provided by the timber on the southern tier of sections.—A. G. Stacey, D.L.S., 1907.

Range 19.

20. This township is traversed by Kamloops lake, the main line of the Canadian Pacific railway and the wagon road from Kamloops to Savonas. On the northeast shore of Kamloops lake, comprised of lots 341, 342 and 343, is some excellent agricultural land irrigated by Tranquille river. With this exception all the country adjacent to the lake on either side is very hilly with frequent rock exposures. There is some scattered pine and fir, though much of the surface is open. These hills are suited only for grazing purposes. Copper has been found within the township and some mining has been done though none was in progress at the time of survey (August). Considerable gold dredging has been done near the mouth of Tranquille river.—A. G. Stacey, D.L.S., 1907.

Range 20.

20. This township lies immediately to the south of Kamloops lake and is traversed by the main line of the Canadian Pacific railway and by the wagon road from Kamloops to Savonas. To the south of the lake in sections 13, 24, 25, 26 and 27 is some good bench land. The soil, though gravelly, is very productive when irrigated. In the vicinity of both Duffy and Cherry creeks excellent crops are obtained. At present the remainder of the bench land is used only for grazing purposes, chiefly as a winter range. It is unfortunate that water cannot be readily procured for this land since the character of the climate and the nature of the soil are favourable to the most successful culture of fruit and vegetables. To the west and south the country rises rapidly. The open bench land gives place to high wooded hills timbered chiefly with bull-pine though scattered fir occurs throughout, becoming more plentiful as the altitude increases. The timber averages about fourteen inches in diameter and is of fair quality, though the growth, in places is rather scattered. These hills are free from undergrowth and furnish good grazing lands. Towards the western boundary of the township the valley of Threemile creek furnishes a narrow strip of fine agricultural land in which several good ranches are located. Hay is obtained only by irrigation in the valleys of Cherry, Duffy and Threemile creeks. All the ponds, lakelets and small mountain streams seem to be alkaline though the water in Cherry,

TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 20—Continued.

Duffy and Threemile creeks is of fair quality. There are quarries, coal or lignite veins. An abandoned mine near was the only indication of mineral seen. Fuel is plentiful. Deer, lynx, bears and cougars are occasionally seen near the township.—*A. G. Stacey, D.L.S., 1907.*

21. The surface for the most part, covered with sage with much rock exposures. Bench land suitable for cultivation. Three very small triangular portions in sections 9 and 18. The timber is of very little value being small. There are indications of mineral wealth in section 18. Copper is abundant in the locality. No hay, game, water-power or lignite veins were seen. The old government pack trail and lake is now very little used and is in poor state of repair. 1907.

Range 21.

19. The provincial wagon road from Savonaa, a town on the Canadian Pacific railway, to the Nicola valley crosses the township. This township lies on a plateau on the left bank of the Nicola river. With the exception of the eastern tip the land is undulating, timbered chiefly with jackpine interspersed with a number of alkaline lakes are located in the central portion. The largest of these are Tunkwa lake and another designated Lake 1. About the lakes in sections 2, 3, 4, 5, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, of open patches, some of considerable extent. The eastern portion is hilly and heavily timbered with a fair percentage of fir and spruce. The timber however is not very suitable for mill use. The growth grows only to a very moderate height. As the creeks are small, considerable expense would also be incurred in hauling lumber to the railway. The township is well watered by the left bank of the Nicola river and its numerous tributaries of the right branch in the southeast and Guichon creek in the southwestern portion. Both of them furnish a fine flow of splendid water. The soil is a shallow loam and is admirably adapted for grazing. Summer frosts are frequent making the cultivation of ordinary vegetables and fruits impracticable. There are no stone quarries, no hay meadows and no minerals. Prospectors have invaded the township in search of copper and silver. Ducks and geese are very plentiful on the lake and are hunted by sportsmen during the open season.—*A. G. Stacey, D.L.S., 1907.*

21. The portion of this township lying to the south of Kamloops lake is comprised of hilly grazing land bearing considerable sage brush. Some excellent agricultural land is found in lots 367 and 368 near the mouth of Threemile creek where irrigation is possible. The country along the north shore is very rough with considerable rock exposure. The hills are sparsely timbered with fir and pine and suitable only for grazing purposes. In sections 13, 14 and 24 are a number of mineral locations. Copper is the principal ore. These hills seem to be rich in mineral wealth, though no mines are at present being worked. Capital is needed both for the development of the mines and for the erection of a smelter, in the vicinity for treating the ore.—*A. G. Stacey, D.L.S., 1907.*

SESSIONAL PAPER No. 25b

TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 22.

16. This township is reached by way of an Indian pack trail leading from the Nicola valley to Mamit lake. The trail here follows the valley of Skuhun creek which crosses the southern part of the township. The country is very rough and hilly reaching an elevation of nearly 7,000 feet above sea level. Sections 5, 6, 7 and 8 are covered with bull-pine and fir. Sections 1, 2, 3, 4, 9, 10, 11 and 12 are covered mostly with jackpine though a few firs are found near the east boundary of the township. In some sections large areas have been fire swept and are now very sparsely covered with small scattered jackpine from two to six inches in diameter. No stone quarries, minerals, coal or lignite veins were seen. Game consists of deer, lynx, bears and grouse.—A. G. Stacey, D.L.S., 1907.

20. Sections 35 and 36 are for the most part, open and very hilly, suitable for grazing. The bench land lying between the railway and the river is nearly level and is covered with a heavy growth of sage brush. There is some fire-killed timber along the river bank. The soil appears to be good and would probably if irrigated, prove very productive. Irrigation, however, by means of water from Thompson river would be costly and could be made use of with advantage only by the installation of a large plant serving a much more extensive area.—A. G. Stacey, D.L.S., 1907.

Range 23.

15. Nicola river, a good wagon road and a newly constructed line of the Canadian Pacific railway crosses this township. Most of the bottom lands in the river valley lie within Indian reserves though three fairly good ranches are located in this township, between the reserves. Skuhun creek crosses the northern part of the township. The valley of this creek is narrow and covered with bull-pine averaging twelve inches in diameter. Small patches along the stream could be cultivated. The surface, however, is stony and the soil a mixture of sand and gravel requiring an abundance of water to render irrigation successful. A settler has located in section 36. The remainder of the township is very rough, hilly and covered with a forest of fir and bull-pine. A wagon road has recently been constructed from the Indian village at the mouth of Skuhun creek to the centre of section 27. No stone quarries, coal or lignite veins were seen. Copper ore has been discovered in section 35. Game consists of deer, coyotes, lynx and grouse.—A. G. Stacey, D.L.S., 1907.

16. The junction of Skuhost and Skuhun creeks occurs in section 1 of this township. A settler has located on the southeast quarter of this section and made some small improvements. The section is covered with bull-pine and a few fir. The remainder of the township appears to be very rough and hilly.—A. G. Stacey, D.L.S., 1907.

20. This township which lies on a plateau, immediately to the south of Thompson river valley, is reached by a fairly good wagon road from Ashcroft. Barnes creek, a rapid stream of fine fresh water averaging about twenty links in width traverses the township from east to west, entering near the southeast corner and leaving by way of section 19. The surface is hilly with numerous rock exposures in the northern part of the township. Considerable open country is to be found in sections 9, 10, 11, 14, 15, 16, 22, 23, 34, 35 and 36. A splendid ranch irrigated from Barnes creek, is located in section 19. Another ranch in sections 27 and 34, irrigated by means of a small stream flowing north into Separating lake, was unoccupied at the time of survey. Fairly good bull-pine averaging twelve inches in diameter is found in sections 20, 34 and 35. Some large fir is located in sections 15, 21, 22, 25, 26 and 28. A thick forest of smaller fir averaging twelve inches in diameter covers the northern slope of

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TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 23—Continued.

Barnes creek valley in sections 8, 9, 17 and 18. Natural hay meadows are wanting though a few places good meadows could be developed at a moderate expense. The country is most suitable for grazing purposes. A small alkaline lake is situated in section 14 and another in section 22. There is also a chain of small lakes in sections 24, 35, 36, 26 and 25. No minerals, stone quarries, coal or lignite veins were seen. Considerable water-power could be developed in the western part of the township, on Barnes creek. Game consists chiefly of duck and geese, though deer are occasionally seen.—A. G. Stacey, D.L.S., 1907.

21. The portion of this township lying to the south of Thompson river is very rough and hilly with the exception of some bench land between the railway and the river in sections 12, 9 and 16, and a very narrow strip in section 6. This land is covered with sage brush and is valueless unless irrigation is employed. The soil is a deep rich clay. Thompson river apparently furnishes the only available source of water supply and irrigation from this source is costly. To the south the country rises continuously, changing gradually from prairie to a forest of pine and fir. The hills provide good grazing lands.—A. G. Stacey, D.L.S., 1907.

Range 24.

20. Those portions of sections 29, 30, 31 and 32 lying outside of lot 406 and the Indian reserve are very hilly. The surface is prairie and the country suitable for grazing.—A. G. Stacey, D.L.S., 1907.

Range 25.

17. Thompson river, the main line of the Canadian Pacific railway and the old Yale and Cariboo wagon road cross the southeastern part of this township. Several good ranches are located along the river. Opposite the little town of Spence Bridge extensive apple orchards have been planted from which excellent returns are realized. Sections 14, 15, 22 and 23 are very hilly and with the exception of a few small patches of open country are covered with a forest of bull-pine and fir averaging fourteen inches in diameter. A few acres of improved land lie in the northwest quarter of section 23 and the southwest quarter of section 26. No stone quarries, minerals, coal or lignite veins were seen.—A. G. Stacey, D.L.S., 1907.

22. Bonaparte river and government wagon road into the Cariboo country cross this township. The rich bottom lands in the river valley constitute valuable ranching properties. In some places these lands are still covered with a dense growth of poplar, willow, alder and cottonwood. The hills, which are rocky and in some places precipitous, are covered with bull-pine and fir. Between the hills and the bottom lands are stretches of rolling, open country used as summer range lands. The river though rapid is not suitable for power development as the banks here are low and the valley lands too extensive. No stone quarries, coal or lignite veins were seen. Mineral is plentiful in the northern part of the township where prospectors have located a great many claims. Copper is the mineral found in greatest abundance. Game is scarce and consists of coyotes, lynx, deer and grouse.—A. G. Stacey, D.L.S., 1907.

23. This township lies on the limit of the railway belt and is traversed by Bonaparte river and by the government wagon road into the Cariboo country to the north. The bottom lands in the river valley are occupied by ranches though some of this property is as yet covered with poplar, alder, willow and cottonwood. The hills on either side are very rough and covered with a forest of fir and bull-pine. A huge

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TOWNSHIPS WEST OF THE SIXTH MERIDIAN.

Range 25—Continued.

exposure of limestone formation occurs in section 20. Mineral is plentiful in the southern part of the township. The Maggie copper mine has been developed to a considerable extent though the plant was closed at the time of the survey. Small water-power could be developed on the river near the north boundary of the township. No stone quarries, coal or lignite veins were seen. Coyotes, lynx, deer and grouse are occasionally seen.—*A. G. Stacey, D.L.S., 1907.*

Range 26.

19. Valuable meadow lands forming a part of lot 1072 extend southward into section 31 of this township. Southward beyond this lot are situated two or three ranches, beyond which the valley narrows and the rich bottom lands disappear. The remainder of the township is probably very rough and hilly. The upper termination of Hat creek wagon road is in this township.—*A. G. Stacey, D.L.S., 1907.*

20. Some valuable ranching properties are located near the southwest corner of this township where the valley of Hat creek widens considerably. Smaller holdings are found northward along the valley. The hills here are not very pronounced. They are sparsely timbered and are used as summer range lands, for which purpose they are admirably adapted. A good wagon road follows up Hat creek valley through this township.—*A. G. Stacey, D.L.S., 1907.*

21. The land suitable for cultivation in this township lies in the narrow valley of Hat creek and is for the most part, covered by an Indian reserve. The greater portion of the township forms part of a large plateau which appears to be very sparsely timbered. Large open stretches of good grazing land seem to be plentiful. The surveys in this township consisting of only one-half of section line on the east boundary of section 33, observations, concerning the character of the country, were made while journeying to township 19 by way of Hat creek wagon road.—*A. G. Stacey, D.L.S., 1907.*

22. This township is for the most part very hilly. The narrow valley of Hat creek, which crosses the southeastern part of the township and along which a good government wagon road has been constructed, furnishes the only land suitable for cultivation, with the exception of a small area in section 6 and 7. Most of the land in Hat creek valley lies within an Indian reserve and is consequently not cultivated. The hills in the southern part are rough and covered with fir and bull-pine. Some limestone formation occurs in sections 5 and 8. Hat creek averaging about thirty links in width is a rapid stream of fresh water. No stone quarries, minerals, coal or lignite veins were observed. Game is scarce.—*A. G. Stacey, D.L.S., 1907.*

Range 29.

2. In this township there is a valley about nine hundred feet above Fraser river comprising parts of sections 26 and 27. This land has been overrun by fire and a dense young growth of willow, alder and fir has grown up over it. The hillsides throughout the township have been burned in most places so that there is little large timber left alive, although much dead timber is still standing. In section 22 and in the southwest quarter of section 27 there is some good land in benches suitable for growing fruit. This land is not hard to clear as the fire has made a much cleaner sweep than in section 26 and other parts of section 27. The month of August was very wet this year which even in this district is very unusual. There is a marble quarry in section 21 of this township.—*A. W. Johnson, D.L.S., 1907.*

Roman Catholic Mission at Sturgeon Lake. Photo. by A. Saint Cyr.

Brulé Lake and Bullrush Mountains. Photo. by A. Saint Cyr.

Brulé Lake and Bullrush Mountains. Photo. by A. Saint Cyr.

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Roche Miette. Photo, by A. Saint Cyr.

Ford across Athabaska River near Jasper House. Photo, by A. Saint Cyr.

PLATE IV

Dutton Post. Photo. by J. N. Wallace.

PLATE VII.

Stone Cairn and Signal on Storm Mountain, B. C. Photo. by P. A. Carson.

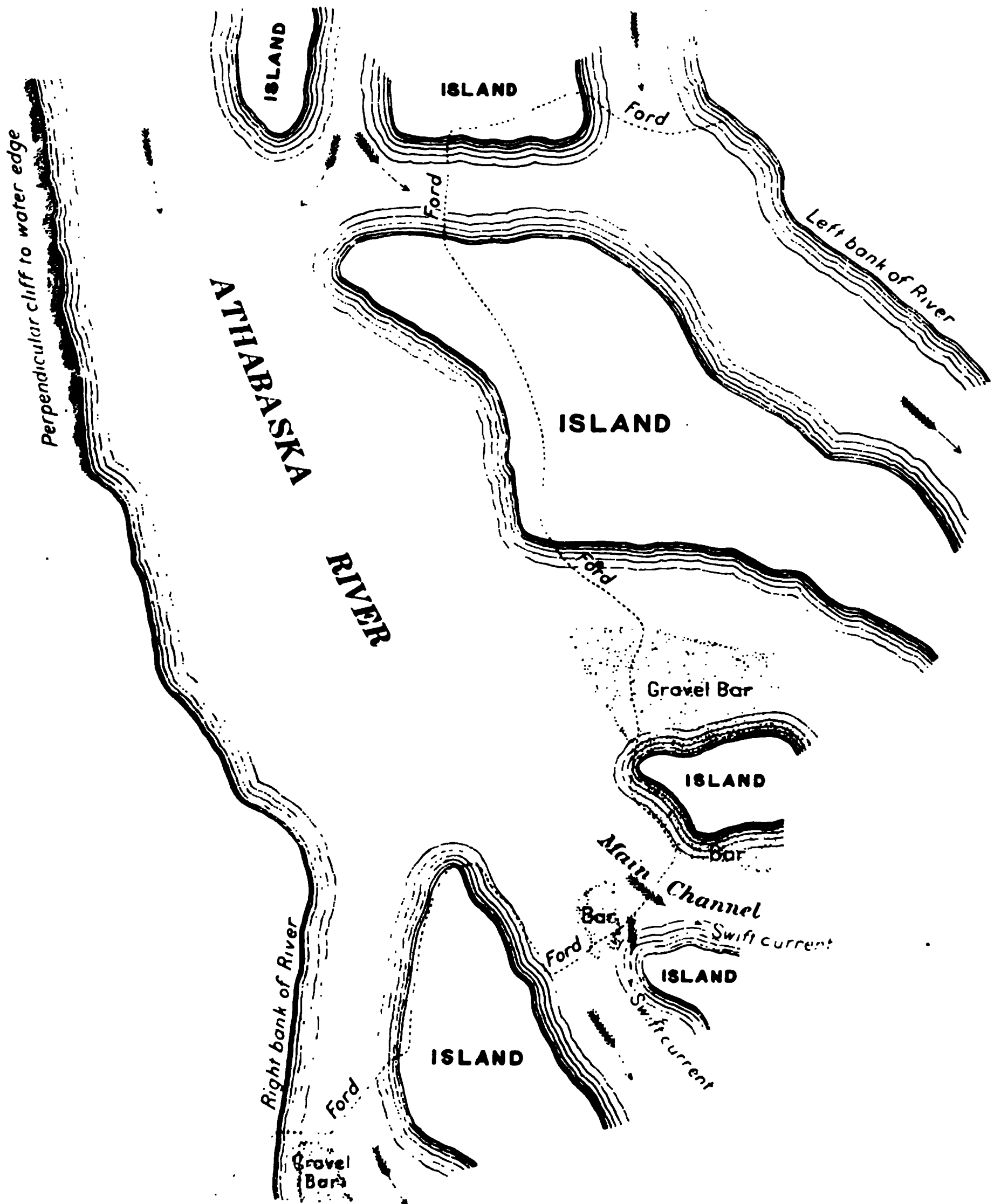


PLATE VIII.

First Fall on the Winnipeg River, east of the Manitoba Boundary. Photo. by W. Thibaudan.

SKETCH OF FORD
across the
ATHABASKA RIVER

3 miles below Jasper House



Roche Miette. Photo. by A. Saint Cyr.

Ford across Athabaska River near Jasper House. Photo. by A. Saint Cyr.

Dutton Post. Photo by J. N. Wallace.

Stone Mound on the B. C. Y. T. Boundary. Photo. by J. N. Williams.

Earth Mound on the B. C.-Y. T. Boundary. Photo. by J. N. Wallace.

PLATE VII.

Stone Cairn and Signal on Storm Mountain, B.C. Photo. by P. A. Carson.



First Fall on the Winnipeg River, east of the Manitoba Boundary. Photo. by W. A. Mendenhall



